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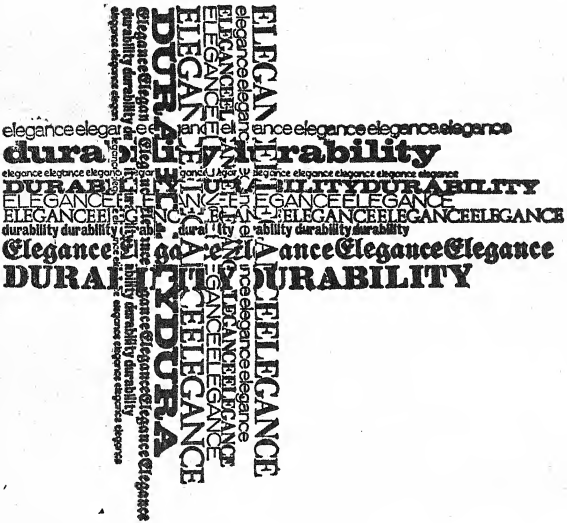

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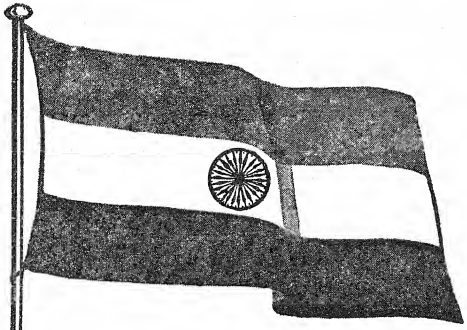

"THERE IS A COROLLARY TO COMMITTING AGGRESSION :
TO BE SO WEAK AS TO ENCOURAGE AGGRESSION."

THE BOMB

By Brigadier E.A. Vas

Certainly it seems now that nothing could have been more obvious to the people of the early Twentieth Century... And as certainly they did not see it. They did not see it until the atomic bombs burst in their fumbling hands.

—H.G. WELLS (1914)

The impact of China's detonation of atomic devices has been felt keenly in India. Some urge that India should make the bomb because it is humiliating not to have it while China flaunts hers in the face of the world. Others oppose it because of the belief that it would be immoral to make a departure from an earlier commitment which the memory of Mr. Nehru has sanctified. Such responses are misleading. The determinants should not be pride or sentiment but the nature of the threat; the forms in which it could become operative; and the manner of counteraction suitable for India in the light of realities.

THE THREAT

THE threat to India could come from two directions: China and Pakistan. These two threats may develop separately or could be combined. Sinologists are divided over the motivations of Chinese policy. It is not even clear whether Peking regards Washington or Moscow as the principal enemy. It is therefore difficult to define China's objectives vis-a-vis India with certainty. China claims over 50,000 square miles of Indian territory, and it can be argued that China's intention in the future is to extend its influence over Nepal, Sikkim and Bhutan, and compel New Delhi to accept the status of a satellite. On the other hand, it is possible, equally honestly, to argue that the Sino-Indian differences are largely the outcome of a border conflict which could have been settled if only it had not been unnecessarily escalated, and that it need not be taken for granted that China will remain hostile to India indefinitely. Taking the best view of China's motives, it will still have to be admitted that both China and India value a position of influence in Asia, and a process of competition could ensure in which the border states might be a focal point. Then, if China has nuclear options which India denies herself, not only is China likely to win the psycho-political game, but she could precipitate a crisis in which India could be blackmailed into paralysis.

There is similarly a difficulty about assessing Pakistan's objectives. A number of people believe that the dispute over Kashmir has been the principal source of trouble with Pakistan. There is, on the other hand, the more widespread view that the conflict with Pakistan is fundamental, and arises from the pre-independence struggle between the rival concepts of secular nationalism and communalism. Advocates of this view contend that India's successful attempts to treat Indian Muslims on a basis of secular equality deprives Pakistan of its *raison d'etre*, and Rawalpindi therefore has a vested interest in keeping the Kashmir issue alive and encouraging communalism.

The difficulty of assessing China's and Pakistan's motives is further complicated by the uncertainty over the nature of the Sino-Pakistani arrangement. How deep is their understanding? Is there any long-term identity of interests between them beyond the desire to harass India? Because the 1965 War has shown Pakistan that she cannot hope to defeat India by conventional means, will she be driven into seeking nuclear military assistance from China? How will Washington's policy of selling arms spares to Pakistan affect her collaboration with Peking?

It should be noted that Pakistan was bellicose even before receiving US military aid (1954), though there is some merit in the view that Pakistan would have adjusted itself to the realities of India's superiority if only the US had not interfered with the natural balance by granting Pakistan military aid. By this kind of logic we can equally blame the USSR for having helped China to become a nuclear power. However we may speculate on the ifs and buts of history, the fact is that the problems with China and Pakistan are not so much the result of policies pursued by the two super powers as of the loosening of old alliances in recent years. China and Pakistan both committed aggression against India after they had virtually broken away from the USSR and US respectively. The two threats to India are real ones today.

FACING FACTS

To these uncertainties not of our making has been added our confused thinking on India's role in Asia. Mr. Nehru, whatever his critics may say of the 'illusions' of his era, had repeatedly denied that India was seeking Asia's leadership in competition with China. This was the plain truth yet few Indians took him at his word. Even today, the majority is convinced that India has been entrusted by destiny with the task of proving that a better alternative to China's model of development is indeed possible. Few of us bother to ask why destiny should not have cast highly industrialised Japan in a similar role?

We add to the confusion by overlooking the truth that China's nuclear bombs have only underscored an exsting situation, and have not

created a new one. "It was obvious many years ago that China is the big upper dog in Asia.. and making this obvious was as much the purpose behind.. (the Chinese).. attack on India as the desire or need for a piece of territory. The bigness was established well before the bomb came. If it was not established in Korea it was in NEFA... Until the other day the foundation of China's stature was not the bomb but her size, discipline, the advantages of population and geography, the upsurge in her economy despite a variety of handicaps, the nerve to gamble, the ability to last out. These enabled China just to sit back and be a terror.. even without the bomb she was an ominous presence."[1]

Thus our adherence to a policy of non-alignment after the Chinese occupation of Tibet in 1950 and after the display of her power in Korea in 1952, were indications that India was not interested in challenging China or joining others in the containment of China. This policy survived the Chinese aggression of 1962, but has been subjected to criticism ever since the Chinese took over Tibet. The criticism has mounted as the years passed with some advocating an alliance with the US with all the advantages and disadvantages. Others, though not going so far, are of the view that India must participate in some scheme of resisting Chinese expansionism in South-East Asia in the interests of our own security. Historians have tried to justify this viewpoint by suggesting that India and China have always competed with one another in South-East Asia even before the era of Western dominance. It is difficult to accept this view. India's culture and religion undoubtedly made a deep impact on these countries but this was surely more a case of their importing what they liked from us rather than our exporting culture in competition with China.

Mr. Nehru's discerning eye had long ago seen these truths. He knew that the competition in South-East Asia was not between India and China but between the US and China. His view had influenced India's policy. Developments in recent years have not changed but only emphasised these facts of the South-East Asian scene. "It might hurt our pride to admit that our role in South-East Asia has been marginal and is bound to remain so whatever we do—adhere to the policy of non-alignment or abandon it.. Those who argue that if China can raise itself··to become a great power so can India, miss the great difference in the historical developments of the two countries··Nehru was not a democratic or Indian version of Mao-Tse-tung. The whole impulse of the Indian revolution was different to that of China. We can only do violence to ourselves by trying to imitate the Chinese. Whether their approach is proper or not is their business, not ours, except inasmuch as it concerns us. Although, it is more than likely that they will continue to come to grief, that is not relevant to this discussion."[2] If there is a case for an Indian bomb it should be argued in terms of our defence requirements.

THE DETERRENT STRATEGY

It is often stated that India's strategy has taken a defensive form, whereby we merely react to aggressive incursions across our border. This has forced us to prepare for and conduct defensive wars at a time and place of the aggressor's choosing; a wasteful strategy which results in a loss of initiative and retards economic progress. Moreover, if repeated aggressions are allowed to continue, it could culminate in a really dangerous attack because the softening-up process will have done its damage over the years. It is claimed that a strategy which includes nuclear weapons is the only one which would deter India's adversaries from attacking her with impunity.

There is logic in this line of argument but only if it is carried to its military conclusion. If China's bombs are to be answered in kind, India's nuclear capability must be a substantial if not equal threat to China, otherwise India will only face the dilemma she faced in October 1962. At that time we had the planes to give air support to the troops in NEFA, but did not use these because the escalation could have become very dangerous. Crucial targets are more vulnerable in India than in China, and India had the air strength to retaliate to such a small extent in fact that the world 'retaliation' would have lost much of its meaning. On the nuclear plane India will have the same kind of difficulties if she is to match nuclear attack with nuclear defence.

The Chinese have built many airfields in Tibet from where their aircraft are within 800 miles of Delhi, Calcutta and Jamshedpur. Range presents little problem to their aircraft if used as a means of delivering nuclear weapons On the other hand, from our northern-most airfields in India, the approximate ranges in miles to the nearest important targets are Chungking—1300, Shanghai —2150, and Anshan — 2200. The task of covering such distances, penetrating air defences, refuelling in flight and returning to base is a formidable one and leads to the conclusion that a credible Indian nucelar deterrent must mean not only the warhead but also the delivery system including missiles, command and control systems,invulnerable sites and an effective air-defence system. Anything less than this will not achieve the aim. Such a system is very expensive and is now beyond our means and technical ability.

If it had been possible for us to build such a complex system out of Indian resources, would we have the will to use the bomb ? To answer this question, we must make an unbiased appraisal of our National Psychology. It will have to be admitted that "the tenor of Indian thinking is pacific, and the ruling elite — who alone will have to make the fateful decisions — will have to close their minds to tradition and steel themselves not to baulk at planning for the use of a monstrous weapon. This is not to suggest that the present nuclear powers are any less sensitive than India to the horrors of nuclear war. It is simply that a hardening of attitudes has to be developed

. . . . and it is the civilians and politician upon whom the burden of decision rests. Hitherto they shouldered only the responsibility of deciding policy, the actual conduct of military operations being left to the soldier. Today, because of the far-reaching implications of escalation··blanket sanction cannot be given to military commanders as to choice of weapons or even targets."[3] It is not impossible to develop these attitudes, but are our people sufficiently interested in this game of power to be able to make the necessary sacrifices required of them if we are to seriously resist Chinese expansion?

Even supposing India possessed nuclear weapons and the will to use these, it is still doubtful, whether this would confer the desired degree of security. The presence of US Polaris submarines in the China Seas has not restrained Peking from giving assistance to North Vietnam. There is no reason to believe that China's ambitions in South-East Asia will be transformed by Indian nuclear weapons.

THE COST FACTOR

India is technologically capable of developing a nuclear bomb. However, the cost for this needs to be properly understood. It has been stated in an official report that "in terms of destructive power, a nulcear weapon is the cheapest thing the world has yet seen — cheaper than conventional weapons by a factor of hundreds if not thousands."[4] This statement has misled many into believing that India can double her defence potential at half the cost.

A recent study gives estimates on what it might cost a country that embarks upon building up a stockpile of only 50 bombs accrued at the rate of five per year.[5] Such a nuclear establishment would be without a long range delivery system and would cost 50 million dollars a year for ten years; this would represent less than five per cent of India's current defence expenditure and probably would not be an unbearable strain on the economy. But as earlier assessed, because of the vast intervening distance between Indian bases and significant targets in China, a bomb without a delivery system would be of little value as a deterrent. To develope even a modest retaliatory force with a delivery system would involve a big jump in expenditure; the costs rise to about 230 million dollars every year over ten years, and would still not include the ancilliary costs of a civil defence and air defence systems which can be quite considerable.

This sharp rise in costs occurs because a missile programme involves research in fuels and guidance systems, a test establishment, the shaping and miniaturising of nuclear warheads, command and control systems. This cost would involve an increase of 20 per cent in India's current defence expenditure unless drastic economies could be made in conventional defence expenditure. Today, India is spending about Rs. 1200.00 crores annually

on defence; this is nearly a quarter of the Government's total annual expenditure and over four per cent of the national income. It is sometimes asked: if such large expenditures are being made for conventional defence, why not develop nuclear weapons whose cost would be offset by a reduction in conventional defence expenditure ?

But those who have attempted this have learnt by experience that their military commitments impel them to retain their conventional forces. Today it is widely recognised that the possession of nuclear weapons has not enabled any reduction either in the size of, or the expenditure on conventional forces. Thus, the present size of our Army will have to remain unaltered. Moreover, the pressing need for reorganising and enlarging our inadequate Navy and Air Force to meet their conventional roles will also have to be undertaken. All this, along with the development of nuclear weapons results in a prohibitive cost.

THE FALLACY OF PRESTIGE

An impatient reader may well counter the foregoing considerations by asserting that all India really needs at this stage is a rudimentary nuclear weapon. Just one atomic 'bang' would not cost much and would bring with it prestige and a voice in international councils. It is tempting to consider that even if military gains are out of our reach because of various limitations, we need not forfeit the political and diplomatic advantages of 'club membership.'

Such a step would bring in its wake several far-reaching consequences. US, UK and the USSR are all opposed to India going nuclear and will spare no effort to prevent this happening. We must certainly expect to lose their support if not arouse their antagonism. Moreover, the possession of a nuclear weapon of any description will completely upset Pakistan's equilibrium and may force them to become a willing Chinese satellite, thereby making a reality of our fears of being encircled on two fronts. We may even invite upon ourselves the very war which we wish to avoid.

These serious consequences are nevertheless deemed by some to be of less significance than remaining perpetually on the defensive as a second-rate entity among the world's nations. This approach overlooks the harsh realities of our dependence on the super powers and, more over, is unduly desperate. "There is not a single instance in which it can be argued convincingly that a non-nuclear power has been compelled to give in solely because the adversary possessed the bomb. The talk of China being restrained from intervening in Vietnam by the threat of the US resorting to the use of nuclear weapons against it has undoubtedly made a great impression in our country. But the validity of this view has yet to be established. The stage has not yet arrived when vital Chinese interests are threatened. . . in any case,

in that event, the Chinese will once again intervene as they did in Korea and the bomb will not be used as it was not used in Korea."[6]

A case has also been made for the bomb on the plea that its possession will prevent China from blackmailing Indians into abandoning Nepal, Bhutan and Sikkim, and will raise our prestige in these border regions. India's problem is that the Himalaya is a vulnerable frontier because of the presence of weak states and tribal populations unassimilated to the Indian cultural stream. But this being so, it is not clear how these weaknesses can be overcome by the possession of the bomb. No proof is available to support the view that possessing a bomb will help a nation to add meaning or power to her domestic or foreign policy. China's place in the world will be decided not by its possession of the bomb, but by the success or failure of its economy, of its system of government and of its relationships with the rest of the world. It would be easy for India to make a prestigious explosion and then sit back and claim the status of a nuclear power. But the value of such a gesture would be meaningless unless this forms the peak of a strong and stable economy able to contain the pressures that will follow and sustain the determination of a disciplined, united and well-fed people who can disarm the suspicions and fears of neighbouring countries.

DISARMAMENT AND NUCLEAR PROLIFERATION

The term 'general and complete disarmament' which is the declared aim of most of the world's civilised governments, does not mean a world in which there are no weapons or armed forces. What it does mean is "a world structure in which the size and power of national military establishments have been progressively decreased to a level at which they will be capable only of meeting the requirements of internal security and providing a residual ability to defend communities against attack from outside."[7]

For some, disarmament is of no interest at all; to a few it is a matter of passionate emotional commitment; to others it is almost entirely a subject of academic interest only; finally, there are those who suggest that disarmament is dangerous as it would de-stabilise existing power balance and result in insecurity. This last theory has been reinforced by the introduction of nuclear weapons into military establishments.

It has been suggested that a strategic stalemate has developed and that the nuclear might of the two great powers has provided a balance of terror in which a nuclear or a major conventional war is impossible. This strategic balance has brought about a relaxation in the cold war and a tendency has developed to regard this stalemate as permanent. Some even go so far as to suggest that nuclear weapons have abolished war. This is a dangerous illusion. The central fallacy in the theory of strategic balance is the assumption that the stability of the world depends entirely upon equilibrium between

the two super powers. While this may be so now, it cannot be so for ever. The emergence of China as a nuclear power in the next twenty years can decisively upset the strategic balance of the world.

And it is not only China that can erode this temporary balance. Apart from the five existing nuclear powers there are a dozen others which can build a nuclear system if they should wish to do so. This possibility, usually referred to as the problem of nuclear proliferation, can be an even greater source of instability than the emergence of China as a nuclear power. The danger of war by miscalculation grows in direct proportion to the number of nuclear powers that exist in the world. "The crucial factor . . . is the problem of the sixth nuclear power. It seems arguable that if we can prevent the present number of nuclear powers from increasing at all, the possibilities of keeping the international dialogue alive and of moving on to more comprehensive and effective measures of disarmament will remain. If, however,one more country decides to take the step of becoming a nuclear power then . . . there will follow almost inevitably a sort of 'domino effect' or 'chain reaction'. This may well mean that in ten or a dozen years after the emergence of the sixth nuclear power, the number may grow to fifteen or more... if the number of nuclear weapon powers begins to grow . . . the roads to disarmament . . . might be finally and irrevocably closed."[8]

Preventing the spread of nuclear weapons is a complex problem and any solution will have to be comprehensive and includean effective non-proliferation treaty, an end to all nuclear testing and acceptance by the nuclear powers of the fact that they cannot expect the non-nuclear nations to agree to a policy of self-denial while the arms race continues among the big five. This does not mean that all these measures should be incorporated in one cumbersome treaty. But if the 'haves' want to persuade the 'have-nots' to sign a treaty of non-proliferation, they will need to show signs of good intent. The difficulties in negotiating such a non-proliferation strategy are enormous. There are the formidable obstacles of effective control, inspection and verification; guarantees to the non-nuclear powers against the possibility of attack or blackmail by those that do not sign the treaty; and ensuring that the developing countries are not denied the advantages of the peaceful uses of nuclear energy. However, the main obstacles in the way of such a treaty are not technical nor economic but only the problems of a common sense and political will.

India is certainly within her rights to demand assurances that peaceful nuclear development is not retarded; and there are no signs that the major powers are interested in preventing this. There have been suggestions that the proposed checks will be inconsistent with the country's sovereignty. A certain degree of inspection cannot be unaccepable to India since no nuclear agreement of any kind can be possible without a system of checks. Moreover, one would have thought that the principle of free

flow of ideas and information on the peaceful uses of nuclear powers is surely to be encouraged.

We may well protest that the treaty provisions are 'discriminatory'—and so they are, because the nuclear powers are major and the others are minor. This is a fact of life which we cannot will away by wishful thinking. This being so, some proclaim that we have no option but to sign the treaty; they criticise India for hesitating to do so "since NewDelhi favours non-proliferation in principle one must take it that . . . objection to the proposed treaty is based on grounds that are substantial. . the insistence that non-proliferation though desirable, is not so desirable as not to oblige that nuclear powers to check the growth of nuclear arms is an astounding piece of unrealism . . Are we to have proliferation until the nuclear powers disarm . . . One can justifiable be cynical about the possibility of such a prohibition but not about the political advantages . . . in opposing or obstructing what is so clearly, desirable, New Delhi is flatly going against the entire trend of its foreign policy in the past."[9]

There is the opposite view that India should continue to abstain from exploding an atom bomb but at the same time refuse to sign a formal anti-proliferation treaty until all the five nuclear powers give positive proof of their intent to treat the problem of general disarmament seriously. This policy forces the super powers to reduce China's isolation and manoeuvres Peking into accepting commitments which she has escaped so far. This policy will also drive home that the essential point is "not that India is technologically incapable of making nuclear weapons, or cannot afford them in a purely economic sense, or cannot deliver them, or has nowhere to test them, but that is determined not to produce them on larger political considerations. This self-abnegation be a country with advanced nuclear capability must, therefore, be regarded as resting on a position of strength which deserves fuller recognition."[10]

THE FALLACY OF GUARANTEES

There remains finally the question of national security. It is asked: How can India agree to non-proliferation or deny itself the bomb if it is to be left undefended? This question has been exercising the minds of our policy-makers ever since China demonstrated its determination to be nuclear when Mr. Shastri sought for a guarantee and hoped that the super powers would provide it. He found an enthusiastic supporter of his idea in Prime Minister Wilson of Great Britain, who, however, cautiously added that it would be unwise to suppose that it would be easy to provide such guarantees. Soon afterwards the Indian position on guarantees began to change, and in 1966, our representative on the Disarmament Commission said: "So far as the non-aligned nations are concerned, security is not synonymous with protection, no matter how powerful the protector or how sincere."[11]

A joint guarantee by nuclear powers for all non-nuclear nations can only be a declaration of intent and would have no more relevance in practice than a document like the Charter of the United Nations. India had also begun to realise that no special guarantee whether from the US alone or jointly with the USSR could be any more credible than the kind of guarantee which has been built into the existing system of alliances. Quite apart from the desirability of such a guarantee, it is also apparent that India cannot expect the same degree of military involvement with its fate on the part of the US and USSR that France and China had been able to get for themselves from these two super powers. For cultural, historical, political and ethnic reasons, the American involvement in Asia may never be qualitatively the same as that in Europe.

Before a nuclear nation offers a special guarantee to a non-nuclear nation, it will expect to be given sufficient control over the foreign and defence policies of that nation. No power can be expected to guarantee India against nuclear attack from China at great risk to herself if it does not have the capacity to ensure that India's behaviour will be responsible and stable. Thus, the great power acquires some influence over the policies of the smaller power. In the case of an alliance, there is at least a sense of partnership and the major argument for entering into an alliance is that one may acquire some corresponding influence over the policies of a great power.

However, assuming that India desired to seek a special guarantee or alliance with a super power, the important question to ask ourselves is whether this is the best way to make our influence felt in Asia. Is it in India's interests to have China confronted by the great powers in the name of protecting India? If we attempt to answer this question it will become clear that a guarantee would neutralise India as a political factor: India will surrender her right to deal with China either as a friend or as an enemy, and thus eliminate herself as a factor in Chinese calculations.

It is also important to consider the effects that any guarantee may have on our relations with Pakistan. "The declared dependence of India for her security vis-a-vis China on the super powers will make it legitimate and possible for them to impose the schemes of 'stability in the sub-continent' which we have been resisting for long. The concept of an internal balance in the sub-continent, that is to say, a rough parity of effective military power between India and Pakistan, would become irresistible if India is guaranteed against China by a single or two separate treaties..Whether India ever takes up its nuclear option or not, it is necessary for it to avoid guarantees if it is to continue to play an independent role in international affairs."[12]

How then is non-nuclear India to be defended? We must remember that China, even before acquiring a bomb, was already a military power

superior to India , and that India's contention has always been that the counter to military power is not always a counter threat of greater military power. Thus, for us now to urge the major powers to disarm and at the same time to ask for their protection is somewhat inconsistent. "For better or worse an American military presence in Asia is an avoidable part of the landscape and one would suppose that there could not be any doubt of US intervention in the event of a Chinese nuclear attack on this country. Yet, the fuss.. created on this point seems to be out of all proportion in relation to a contingency that is improbable and in the event of which any existing nuclear guarantee will be the least decisive of factors. A more helpful perspective could be achieved if New Delhi rids itself of the notion that the Chinese military threat is the only shaping factor in foreign policy."[13]

THE CHOICE

The perceptive reader will have noted that reference to inviolable moral principles has been studiously avoided throughout this paper. The matter, however, deserves final mention. One thing seems to stand out above all is that we must begin to accept that relations between nations should be conducted on a basis of morality at least as binding as that which governs the conduct of affairs between individuals. We cannot continue to accept the outdated view that a nation can steal, lie, cheat, kill, stockpile bombs and pollute the atmosphere with nuclear test-bombs so long as it does it in the interest of its citizens. In fact it is becoming extremely doubtful whether any single nation acting independently can any longer guarantee either the survival or the prosperity of the individual.

In the long term, this change of attitude in group behaviour is clearly a matter of sustained education so that adults and children are taught that humans behave as they do, not because they are Chinese, Pakistanis, Americans or Indians, but because they are human beings. The first sign that such sane rethinking has begun will be the acceptance by great powers of the political and military risks of an arms-control treaty; and of the small powers of an anti-proliferation treaty.

The issues that are reshaping India's foreign and defence policies are of vital importance. The several options open to India, which have been discussed can be summarised as follows:—

(a) Explode an inexpensive atomic device.
(b) Over the years, build up a credible weapons system no matter what the cost.
(c) Sign the treaty, with or without a guarantee or alliance.
(d) Declare that it is our continued intention not to make a bomb, but refuse to sign a formal anti-proliferation treaty.

None of the choices open to India are attractive. We do not have much room for manoeuvre. Whatever be the decision, it should not be determined on sentiment, pride or delusions of grandeur but be based on hard realities and practical considerations.

1 'Earnest Thinking Needed on the Atom Bomb' by Pran Chopra. *The Statesman*

2. 'The Dilemma' by Girilal Jain, Seminar, July 1966

3 'India and the Bomb' by Maj. Gen. Som Dutt. Adelphi Paper No 30 Institute for Strategic Studies *The Times of India*, 16 Jan. 1967 *et seq.*

4 'Nuclear Explosions and Their Effects' by Dr. Bhabha and Dr. Kothari, Published by the Government of India 1965, as reported in *The Times of India*, 18 Nov. 1964

5 *Ibid*, Note 3

6 *Ibid*, Note 2

7 'The Politics of Disarmament' by Lord Chalfont. *Encounter* Oct. 1966

8 *Ibid*, Note 7

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DEFENCE-ORIENTED PLANNING

By Lieut-Colonel Goverdhan Singh Jamwal

INTRODUCTION

We are an old nation and yet a young independent sovereign country. With the creation of new states like Pakistan and evolution of new ideologies such as the ones embracing the mainland of China, we have to shape our future keeping in view the trend of our future relations with such neighbours in particular and the world in general. The two conflicts in the early years of our independent existence have, therefore, been a blessing in disguise for us. The Chinese agression in 1962 brought home to us the necessity of security and the consequent expansion and the modernization of the Armed Forces, but the sound of the guns in this conflict was too far away from the common man who really matters in a democratic country like ours. The more recent conflict with Pakistan in 1965, though very short-lived, encompassed the home front to a much greater extent, and had a tangible effect on the common man. Similar conflicts may be thrust upon us in future too.

While the planners at the highest level may be thinking of integrating the defence requirements with the future plans of the States and the country, it is essential to point out as to what a soldier on the front line demands of such defence orientation to make his task easier on the battlefield and that of his opponent more difficult.

AIM

THE aim of this paper is to examine the requirements of a soldier in the field and see how best these can be met by defence-oriented planning in the country.

Requirements of a soldier

A soldier would like to have the following before and during the conflict:

(a) Some warning before the impending conflict.
(b) If the warning is not enough and the initiative rests with the opponent, some marginal time to offset his initiative.
(c) Natural strength of the initial defence line.
(d) Easy movement of troops, vehicles and stores to the front line.
(e) Arrangements for denial of the similar means to the opponent to slow down his move and operations to upset his plans.
(f) Friendly and dependable civil population on the borders.
(g) Arms, equipment and means of transportation to match suitably with the standards of the likely aggressors.

The above requirements can only be met with the highest co-ordination and maximum integration of defence requirements with the country's planning from the very start. The main agencies and departments concerned are as follows:—

(a) States, particularly the border states, for
  (i) Intelligence;
  (ii) Police and Home Guards; and
  (iii) Friendly population on the border;

(b) Railways, PWD, airlines, civil and inland water transport agencies;
(c) Irrigation;
(d) Forests;
(e) Industry; and
(f) Defence

INTELLIGENCE

We shall not deal here with the battle intelligence about the enemy and his intentions, for it is a subject by itself and its importance hardly needs stressing. However, a soldier would be interested to know all about the terrain on the borders, preferably on both sides. All information regarding the terrain affecting defence should be passed by all concerned, particularly by the border states, to the Ministry of Defence who should keep the maps up to date. In a developing country there will be continuous changes by way of new roads, canals and bridges, airfields and so on. As we know, some of them will have a great bearing on the conduct of operations in that area.

The state Police, Home Guards and the Central Police posts on the border can help considerably in this respect. They will be able to give a certain amount of information gained through locals about the enemy territory contiguous to our border areas. A positive effort should be made in this respect.

The Police and Home Guards and such other elements should keep some highly reliable personnel including civilians to act as guides for the Army in the event of operations. They should include some interpreters and trackers as well, particularly on the Northern borders in NEFA where it is difficult to work without their help.

The work will be largely facilitated if we have a reliable and aggressive civil population on the borders like the ex-servicemen, who will automatically act as deterrent to the enemy's cold war activities and provide good intelligence and guides in case of hostilities. A sound and tough civilian around is a great morale booster to the soldiers in battle. This is, therefore, a pointer to reclamation of land and planned resettlements of the right type of people on the border.

COMMUNICATIONS

Roads and railways play a vital part in the modern warfare. The defence requirements should have a priority in the border areas. Our border road organisation is doing a magnificent job along the Northern regions of the country but phasing of the road construction programmes and allotment of priorities probably need further examination. In the modern concept of warfare whichever country can move its forces faster to the border and can maintain them longer will retain the initiative over the other. It will also retain the capability of opening a new front by hitting its opponents on the flank, which might cause considerable worry to them and force them to re-act as desired.

For similar reasons stated above, expansion of civil airlines should keep in view in their planning the use of civil aircraft for defence purposes in any emergency.

Our road, rail, air and inland waterway system along the borders should, therefore, be so laid that it meets the defence requirements enumerated above. Our communication system should also have a bearing on the enemy's communication system leading to the border.

TRANSPORT

During the 1965 conflict, civil transport helped us considerably. Though the impromptu arrangements worked, for a long drawn-out war we should have a proper system of pooling the civil transport for defence purposes.

IRRIGATION

The irrigation system can play an important part in the defence in areas like the plains of the Punjab. Ichhogil canal has amply proved it in the case of Pakistan. We should so plan our canals that they run parallel to our border so that they can be used for the defence of the country and yet serve irrigation needs. The canal system should be linked with rivers, nullahs and lakes to form a continuous obstacle all along the border. This will provide added security and also a check against infiltration. The canals should be so laid that their higher bunds should be on the home bank, with a road running behind the bund.

Similarly our distributaries should be so laid that we can develop any area into an anti-tank obstacle by flooding. This is the quickest, easiest and most economical and effective method to stop a major tank thrust along any unexpected approach in the absence of a necessary superiority in arms.

The idea of using canals for defence is not to create a Maginot line, but to create an obstacle which could be used in case of surprise attacks into our territory.

FORESTS

We should develop certain areas preferably near the roads and parallel to the border well inside the border to provide cover for our vehicles and

administrative echelons. The trees so planted will also add to the national wealth. Such trees would also restrict the manoeuverability of enemy armour if it did penetrate to this line and thus would serve as an anti-tank obstacle in depth. Besides, it can augment the supply of defence stores in emergency.

Where the canals cannot be laid, as in Rajasthan, similar plantations in the form of a linear belt along the border could be used as an anti-tank obstacle. These trees could be local trees like the palm, castor and date. This will provide sufficient warning to enable us to find out the intentions of the enemy and counter his move with our mobile reserves. The plantation of such trees may take many years but it will be a step in the right direction.

INDUSTRY

The defence orientation of the industry, both major and small scale, is vital for the defence of the country. Maximum industrial units should be capable of switching over to defence production. All the industries in the country, whether big or small, will not be enough to meet the requirements of the defence forces in a prolonged war. The expenditure of a few items only like ammunition during the 23 days of war has given us some measure of the problem. All industries, therefore, must have an alternative production programme, for example a fertilizer producing unit to switch over to tractor production, and the civil automobile industry to switch over to military vehicles.

During the 1965 conflict there was a shortage of tinned milk and many other similar items, which can be produced indigenously provided we have catered for such contingencies during our planning. There is a requirement of providing adequate encouragement to the private sector to come into the field of manufacturing equipment for the defence services.

The weapons and equipment require constant change and development to match the standards of the likely aggressors and suit the terrain and tactics. The new weapons and equipment have a tremendous effect on the conduct of operations and morale, notwithstanding the quality of the man behind the weapons. Moreover, it has also been learnt that dependence on foreign countries for the basic supply of weapons, ammunition and equipment is not desirable. It is, therefore, essential that we should have the capability and capacity to manufacture the basic defence requirements in our own country so that we may not have to look over our shoulders in the time of need; and organisation to evolve new weapons and equipment, but at the same time we have to bear in mind the time lag involved in developing equipment and to absorb it before it can be used effectively. This requires foresight in planning, the use of research and development organisation and the defence orientation of industry in the country so that this aspect is not overlooked during the peace and planning.

CIVIL DEFENCE

The importance of civil defence including air-raid precautions and care and help of the raid-affected civilians hardly needs any further emphasis in view of our recent experiences. A good civil defence organisation will help to keep the morale of civil population high which is so closely linked up with the morale of the soldier on the front. The people have proved that it is not difficult to achieve this, but proper organisation must exist to cater for expansion in the event of need. The small air-raids on our cities in the 1965 conflict were only a pointer to the magnitude of the task in case we are involved in a major conflict with a major power probably having nuclear capabilities.

Civil defence against nuclear attack calls for dispersion and underground constructions. These cannot be achieved overnight. For effective defence against the nuclear attack in 1980, we should plan and take steps now.

CANTONMENTS PORTS AND AIRFIELDS

Many of the states in the past have shown unwillingness to give land for the building or expansion of cantonments. It should now be clear to us that we should have permanent cantonments all along the border where we may station formations and units to be committed to battle at a short notice. They will have the opportunities of training on the same ground where they may be called upon to undertake operations. It will facilitate deployment and also serve as a deterrent to the opponent. The exact location of the cantonments may depend upon the ground and defensibility of the area, but may be 25 to 50 miles from the likely battle locations, well spread out along the border and in depth.

Similar considerations will affect the location of civil harbours, ports and quays for the Navy and airfields for commercial airlines and the Air Force.

PLANNING

To integrate the above requirements of defence it is suggested that all the states, particularly the border states should have in their planning boards representatives of the Armed Forces. These representatives should ensure that all the above requirements of the services are kept in view while making the development plans in the states.

In the formulation of the plans, political considerations should not overrule and even economic considerations should compromise with the defence requirements. It is, therefore, suggested that the planning boards of the states and at the Centre should have the heads of departments and a senior Armed Forces representative. These plans should then be studied by the joint planning staff at the Defence Headquarters and by the Defence Committee of the Cabinet before they are finally approved by the Central Government.

Similarly there is a need for the inclusion of a representative of the Armed Forces in the Planning Commission, who should advise the Commission about the defence aspect right from the inception of the plans. Once the plans have been formulated, it often becomes difficult to change or modify them to suit the defence requirements.

CONCLUSION

We have studied the requirements of a soldier in the battlefield with regard to the defence. He wants some warning before the conflict and if the warning is not enough, some time to upset the enemy's plans with the maximum help of naturally strong defence lines. He also wants an uninterrupted flow of men and material to battlefield at the same time denying the same to the enemy. Above all he wants to have a friendly and dependable civil population on the border. These defence requirements can only be met by proper integration of plans by the States and the Centre, particularly by our Railways, PWD, Forests, Irrigation, Transport, Industries and the Defence Department. These must be coordinated by a planning Board in each state represented by a senior officer of the Armed Forces, scrutinized by the joint planning staff and the Defence Committee of the Cabinet and approved by the Central Government. It is also suggested that the Central Planning Commission should include a representative of the Armed Forces.

What we need a few decades hence we should plan now, All our plans should be defence-biased or dual purpose plans, for we cannot afford to have two seperate plans in the country for many years to come. This is the only way to achieve some measure of defence potential with the meagre resources that are and will be available to us in the foreseeable future.

POPULATING THE BORDERS

By Major BS Tyagi

Frontier policy is of the first practical importance and has a more profound effect upon the peace or warfare of nations than any other factor, political or economic.

Lord Curzon

INTRODUCTION

INDIA's population, which has already reached a critical point of expansion, has two very noticeable features:-

(a) The border areas are, by and large, very thinly populated.

(b) The people in many of these border areas have close and distinct ethnic, religious and linguistic affinities with those across the border.

Compare, for instance, the population per square mile of NEFA (11), Nagaland (58) and Manipur (90) with that of contiguous Assam (252); or of Himachal Pradesh (124) and Rajasthan (153) with that of neighbouring Uttar Pradesh (649). Within the border states themselves, the population gets thinner as we go nearer the international boundary. For example, Spiti region of Himachal Pradesh has only 2500 people living in an area of roughly the same number of square miles. The Mongoloid character of our people on the Northern and Eastern borders and their ethnic and other links with the people beyond are well known. Both these conditions do not exist in areas bordering East Pakistan which are therefore not being considered here.

AIM

THE aim of this paper is to study the problems posed by this seeming imbalance of our population pattern, with particular reference to its effect on national defence, and suggest certain steps to minimise the inherent dangers.

PHYSICAL BARRIERS

Our entire Northern frontier rests on the Himalayas. Most of our Western and Eastern frontiers also rest on mountains, deserts and forests. For centuries, such geographical expanses, particularly the mighty ranges of the Himalayas have been considered as effective barriers against hostile

incursions across them. But a brief look at history should dispel this popular belief.

No geographical barriers have stood against man's movement in search of home and food and the Himalayas too have not been an exception, much less our other lesser barriers. There are hundreds of passes along which flood tides of Mongoloid peoples have now and again been descending into India. Trades and marriages have been the most frequent attractions but movements for aggression and living-space for their increasing numbers have not been infrequent. Ahoms crossed the Himalayas into Assam in the thirteenth century; Burmans and Shans in the seventeenth; Lushais and Kachins in the nineteenth. Young Husband's expedition and Zorawar Singh's army crossed the Himalayas in the opposite direction. These are only some of the many instances of organised movements of men across these borders.

ETHNIC AND OTHER AFFINITIES

It is true that no present-day state possesses a homogeneous ethnic structure, and racial purity, in the correct biological sense, is non-existent. It is also true that, given goodwill, ethnic differences should not hinder the internal unity of a state. However, both these truths should not be taken for granted and ethnic structure must be considered as a strong human factor in political behaviour of a group of people. Race consciousness in which are epitomised a welter of myths and ideologies has very often provided a formidable barrier to the successful integration of human elements. It is an oft-repeated historical fact that the existence of ethnic minorities which, for one reason or other, could not be fully integrated in the national whole, proved to be the source of weakness and friction, and, in some cases, led to dissolution of states.

Language of a people is a very important distinguishing feature and the only way to overcome its divisive effect is either to recognise it at the national level (which is no longer a practical proposition in India) or to corrode its distinctiveness by a wide and free interplay with the languages of other people having more dynamic habits. Otherwise it is impossible to eliminate the separating influence of a language.

Religion, the next distinctive feature, is both a unifying and a disruptive force. Toleration, the only answer to its disruptive element, implies that people of different religious groups should be brought together and not left in isolation. The same is also true of historical background and associated cultural traditions. One does not have to be a geo-politician to understand the contribution of these forces in the making and breaking of political units in the world. Nothing can be more dangerous than to ignore these forces and let them follow their own course in isolation. It

will be good for us to note that even in well-knit states like the USA and Canada, separation based on racial and linguistic differences has recently raised its ugly head, and that an alarmed Great Britain has already launched big schemes for a closer merger of her many inhabiting communities.

POPULATION—DENSITIES AND PRESSURES

As stated earlier, large areas on our borders have only a thinly scattered population. A severe climate, poor means of communication and lack of economic support are considered to be the restricting factors. The first two, however, are not peculiar to our borders, and many equally cold and inaccessible places in the world have an appreciably large population. As regards the economic backwardness, it is debatable—at least in certain sectors of our Eastern and North-Eastern borders—whether the meagre population is its cause, or its effect. In any case, mankind has today reached a stage of scientific advancement at which its material needs can be satisfied to an extent never before possible.

An important factor in our national defence is that both China and East Pakistan have been 'population pressure' geo-political regions throughout the history. China has been the largest single contributor to the population of South-East Asia and has turned her attention to her immediate South, after a lapse of a few centuries. Her population tides are bound to exert pressure on India's borders after she has filled the empty spaces of Tibet and Sinkiang which she is at present doing. East Pakistan, on the other hand, is already turning out its excess population running into thousands every year. (The normal exodus from East Pakistan into India up to August 1967 was 1000 to 1100 refugees per month, going up to 2000 per week at times). It is easy for these countries to mix a design and pattern in such emigrations with calculated political aims.

EFFECT ON INDIA'S SECURITY

Mao Tse-tung has already spoken of a 'Mongoloid Federation' of the Himalayan Region on grounds of racial affinity. China's claim South of the six passes on the HP and UP borders, i.e. Shipki, Man, Niti, Kungri Bingri, Dharma and Lipulek, as well as on approximately 40,000 square miles of NEFA is entirely based on this. On the Kashmir border also, her different attitude to Pakistan occupied area is easy to understand. The people of Gilgit and Baltistan, as opposed to those of Ladakh, are Muslims and ethnically distinct from those of the adjoining Chinese regions.

As things stand, we shall have to live with the twin threats of aggressive incursions and population floods from China for a long time to come. A thinly populated border will, for ever, be an invitation to the Han race with its outstanding history of expansion and movement. It will not be difficult

for it to find allies and sympathisers among peoples living in social and economic isolation, whose community of race, religion and language it can easily exploit. (That is exactly what China did in Malaya before the Emergency). These regions can be the hotbeds of many anti-Indian activities and valuable assets to the enemy in the event of armed conflict.

Conversely, an economically backward area with a population barely able to exist and, at best, not able to whole-heartedly support the national cause, can be a stupendous liability to India during active hostilities. Even in the cold war period, with unfriendly neighbours abetting and encouraging disruptive forces, things could very well go out of hand. We have had a foretaste of active interest being taken by Pakistan and China in Nagaland, Mizo Hills and Naxalbari, and cannot afford to let the natural processes of national integration produce the results without active help.

It is worth remembering that whatever happens in our far-flung border areas, not only affects the security of our own country but also of neighbouring friendly countries like Burma and Nepal as well as other states towards whom we have special responsibilities, e.g. Sikkim and Bhutan. It also affects the valiant Tibetan and Khampa patriots who are now fighting for their very survival in their own land.

THE AIMS AND POLICY

From the foregoing, it cannot be over-emphasised that the twin problems of lack of population which could be an effective answer to any evil design of the enemy, and economic backwardness need urgent remedial action. It calls for a comprehensive policy with the following minimum aims:—

(a) Bringing the density of the populatjon to an adequate level.

(b) Expeditious merging of the existing border population into the national whole.

(c) Making these areas economically viable.

The problem of lack of population can be adequately solved only by transplanting population from the plains where it is breaking all seams. I am not suggesting a policy of displacement and extermination as is being pursued by the Chinese in Tibet or Sinkiang, or has been practised by some very civilised countries in certain regions. Nor is there a scope for large-scale internal migration as a means of relieving population pressure in the plains. What is needed is the voluntary and supplementary settlement of people and intensified land utilisation programmes in these areas.

India is not unfamiliar with the problems of refugees and we have considerable experience in rehabilitating both rural and urban population

—from across the border, from areas acquired for urban and industrial development, people uprooted by dams or natural calamities, ex-servicemen, long-term criminals—to name a few. All our efforts so far have been in settling the uprooted people in nearby developed areas although in bigger projects like the Dandakarnya, considerable development work had to be done before the actual settlement began. Given encouragement, protection and facilities a large number of these people can settle on lands made available on the border and money and effort spent there will be doubly rewarding.

Within India there have been waves of inter-provincial migration all through the ages. This process received a set-back under the British in some sub-Himalayan regions. Apart from controlled plantation labour, only Christian missionaries, anthropologists, botanists and scientists were allowed into these 'excluded' and 'partially excluded' areas to carry out their activities. This naturally impeded the development of these areas as well as of a national mind and we shall do well to pull down these restricting walls of outdated regulations.

On the face of it, settlement of 'outsiders' within an exclusive area should cause resentment to the local tribes, but with good publicity, tact and determination it need not be so. Nor need we fear undue exploitation of the tribal people by the new settlers, which, if necessary, can be prevented by law. Official plans exclusively for the tribal people tend to make them more dependent on external assistance and do not bring about a general development of the area, covering all spheres of life of its inhabitants. Only by the induction of more enterprising and dynamic people from the hinterland is such a development possible. It opens the gate of employment opportunities, association and social and cultural intercourse as nothing else does. Thus alone can the tribal people be conscious of their place in the nation and contribute to its security and prosperity.

Any programme for the border areas must start with a comprehensive survey. There is no dearth of land, and in most places, water for irrigation is also available. This should give us enough food for an increased population. An extensive road development programme will open vast storehouses of nature for us to explore and exploit, We must carry the benefits of modern scientific and technological advancement to the tribal people through those who have experienced them. If, in raising their living standards and helping them to march in step with their fellow countrymen on road to progress, we are faced with the choice of 'detribalising them' or 'preserving them as museum pieces', we should unhesitatingly 'detribalise, them.

A FEW SUGGESTIONS

Once we realise the dangers inherent in the policy of laissez-faire in respect of our border areas and are convinced of the urgent necessity of

taking some corrective measures, ways and means will not be difficult to find. A few suggestions are offered below:—

(a) The entire work of settlement and development should be entrusted to a specially created organisation consisting of dedicated and highly motivated officials, as it may be too much for the present administrative machinery to undertake this task. It should be given a time-schedule, adequate powers and full facilities for carrying out all the work concerning settlement of people in and development of border areas, section by section.

(b) Settlement areas should be allotted on as required basis to those states which have the mind and means to shift certain sections of their inhabitants. These states should be made responsible for development of their settlements until a certain stage of self-sufficiency is achieved.

(c) The three Services of our Armed Forces have a large number of ex-servicemen to rehabilitate every year. In the Army itself, each regimental and corps centre has the capacity to sponsor a settlement and should be encouraged to do so. Similarly the Indian Railways and other such big employers of men should be persuaded to adopt some settlements for their retired personnel.

(d) Every time there is tension between India and Pakistan, we see a strange spectacle of hundreds of people on our border crossing over to Pakistan, only to come back and reclaim their homes and properties when things cool down. Whereas it is correct and fair to sympathise with and help these scared people, this state of affairs should not be allowed to go on. Their need for greater security than that afforded by border life should be recognised. After a thorough screening they should be resettled farther inland and their places used for fresh settlement.

(e) Many of our religious endowments have vast incomes. A little persuasion and public opinion should be enough to enable them to divert a part of their funds to mission and development work in these areas.

(f) All discriminating laws should be repealed and maximum freedom of movement, trade, acquisition of property and other social activities in these areas be allowed to all Indians. This, of course, cannot be allowed to foreigners whose presence and movements in these sensitive areas should be thoroughly scrutinised.

(g) The plains of India have a large population of nomadic tribes who have remained unsettled in spite of all the intention and efforts of the Government, mainly because of lack of space. Although some of these were scheduled as 'criminal tribes' by the previous Government, they are known for their industry, social life, and ability to live on very little. Their organised settlement in border areas can solve both the problems of finding lands for them and border security.

It is fully realised that the task of populating the borders will be fraught with many and varied difficulties. Narrow regionalism, resistance of certain misguided tribes, inertia and false loyalty of local officials, opposition of self-appointed advisers and experts, adverse criticism in certain sections of the press, diplomatic moves by some interested countries, will all come in the way. Coupled with these will be the lack of funds and enthusiasm in concerned quarters. But in the interest of India's security, they have to, and must be surmounted. A beginning must be made. Some of these areas are directly under the Central Government administration, who should assume responsibility for the remaining border areas and arm itself with the necessary legal powers.

We have before us the example of Malaysia where, in the first two years of Emergency, 400 new towns and villages were created and 500,000 people resettled. On a smaller scale, resettlement of a section of population has been done in the Mizo District of Assam. Let that be the beginning of a gigantic programme to fill the empty spaces on the border with self-reliant villages. According to a newspaper report, 50 colonies are being set up in Assam alone for the refugees pouring in from East Pakistan, whose number since partition has crossed 7 million. Let these colonies be set up in border areas, and not in the already overcrowded Brahmputra Valley. A large number of people from Andhra Pradesh, Bihar and Orissa are working in tea estates and coal-mines in Assam and NEFA. In many cases, due to overpopulation and sheer lack of space, their living standard has come down below subsistence level. Let these three states co-operate with the NEFA administration and settle the surplus of these hardy people on land along the border. This will not only meet the elementary responsibility of a welfare state but will also be a step in the right direction towards strengthening our border defence.

There is no denying that in finding places for settlement, some forests will have to be cleared. This need not unduly alarm us. Some of these which have been providing hideouts to lawless elements and cover for illicit movement to and from neighbouring countries must in any case be cleared. The place of forests in the economy of a country should be viewed in the light of the requirement of living and agricultural spaces for its people. The importance of forests as the rain-making factor as well as the complete dependence of agriculture on rain are neither supported by scientists any longer, nor valid in the context of India's present food difficulties and security problems.

CONCLUSION

An attempt has been made in this paper to draw attention to a problem which is both vital and urgent. The scarcity of population on our borders, with the near isolation of that population from the

rest of the country because of anthropo-geographic division and difference in economic and social progress, has dangerous potentialities. Development of these areas and assimilation of their inhabitants in the body of the nation must be taken in hand. This cannot be done by letting things take their own course, for that will be evasion of responsibilities. The process of assimilation has to be actively aided and the organised induction of people from the hinterland in sufficient numbers into these areas is the most practical step in this direction.

In this context two extracts from Dr. Ram Manohar Lohia's "A Himalayan Policy" are worth reproducing :

Neither the snows nor the unscalable heights of the Himalayas can do sentry duty for India.....Old concept of foreign and defence policies must change. The strategic is now also the moral, the national is the all world and the interest of India, the world and the Himalayan peoples coincide.

An integrated economic and population planning for Himalayan India must be put into operation and resources of all India in money as well as in men must be utilised in order particularly to make the whole area lush with orchards.

Is it beyond the capacity of our great country ?

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INDIA—AN OLD MARITIME POWER

By Major General Har Prasad

He who rules on the sea will shortly rule on the land also.' Thus spake the Turkish Admiral Khaireddin Barbarosa to Sultan Suleiman The Magnificent in the 16th Century.

GEOGRAPHY

THE Indian Ocean has to a very large extent, influenced the shaping of Indian history. Hence a short description of this ocean in relation to the land mass surrounding it would not be out of place. The Indian Ocean has been described very aptly as a land-locked sea with the Indian Continent forming the roof over it, and jutting out into the sea for a thousand miles. The continent of Africa forms the western wall while Burma and Malaya constitute the main bulwark on the eastern side. In spite of the vastness of the Indian Ocean and the oceanic character of its currents and winds, it is more like a land-locked sea. This makes it different from the Pacific and Atlantic Oceans which lie from north to south like gigantic highways.

HISTORICAL BACKGROUND

In these days when powerful nations operate fleets of ships, submarines and aircraft, all capable of delivering nuclear weapons, the important place that India occupied in history as a leading maritime power seems to have been forgotten. It may interest students of naval history to know that until the beginning of the 16th Century when Vasco da Gama rounded the Cape of Good Hope and discovered the sea route to the East, India's control of the Indian Ocean was supreme and extended up to South-East Asia.

From the ports on the East Coast of India, argosies have sailed this ocean from the dawn of history, and the colonisation of the Pacific islands by the Hindus shows the extent to which this ocean had been explored and navigated at least 2000 years ago. Evidence of a flourishing trade between the Levant and the West Coast of India may be inferred from allusions in the Old Testament. References have also been made in the ancient Hindu scriptures, the Vedas (1500 B.C.) to voyages by sea in ships with a hundred oars. These ships are depicted in carvings on ancient monuments and proof of it is available in excavations of remains of ancient civilizations at Mohenjadaro and Harappa. Professor M.G. Rawlinson in his book "Intercourse between India and the Western World" has confirmed evidence available from European and other sources, of the shipping activity in the Indian Ocean from the earliest times to the fall of Rome.

Nearchus, the Greek Admiral, transported remnants of Alexander's Army to the Persian Gulf in Indian built ships navigated and piloted by Indians who were familiar with the route and conditions at sea. The first known shipping laws were framed by Manu in 200 B.C. Kautalya's *Arthashastra*' written in the 4th Century B.C. lays down the functions of the Port Commissioner and Harbour Master. Hindu kingdoms and empires were established and flourished from the 5th to the 13th centuries in Thailand, Cambodia, Java and Sumatra and other areas of Indonesia. For about five centuries the Sri Vijaya kings were lords of the ocean. Their authority was challenged by the Chola Emperor Rajendra from South India who defeated the opposing navy, captured Kedah and established the Chola power in Malaya in the year 1025 A.D. This rivalry between Sri Vijaya kings and the Cholas lasted for about a century. This weakened the Sri Vijaya Empire which finally brought about its downfall in the 14th century and opened the way for Moslem influence in the Indian Ocean.

After the downfall of Sri Vijaya and the disappearance of the Cholas from the stage of Indian history, oceanic trade in the Indian Seas passed almost exclusively into Arab hands. The Moghuls did not recognize the importance of the sea. Their views were similar to that of Khalif Omar who thought that "the sea was a huge beast which silly folk ride like worms on logs." This attitude of the Moghuls during their reign of 200 years encouraged foreign powers to gain a foothold over the Indian mainland.

It may seem strange, but it is none the less true, that till the last decade of the 15th century, none of the European nations except perhaps the Vikings had ventured into oceanic navigation. The navigational activities of the European peoples were confined to the inland seas like the Mediterranean, the North Sea and the Baltic and to the coasts of Europe. Only the Hindus, the Chinese and the Arabs had developed a tradition of oceanic navigation.

ADVENT OF EUROPEAN POWERS IN THE INDIAN OCEAN

Challenge by the Calicut Fleet: Vasco da Gama rounded the Cape of Good Hope and arrived in Calicut in May 1498. His ship *San Gabriel* was navigated across the Arabian Sea by a Malabar Hindu whom he engaged at Melinde. The claim of the Portuguese as "Lords of the Sea" was challenged by the Zamorin Ruler of Calicut. In 1503 his fleet under Kassim attacked the Portuguese Armada anchored off Cochin and forced Vasco da Gama to withdraw with his ships to Europe, but Kassim failed to destroy the Portuguese fleet. With the defeat of the combined fleet of the Zamorin of Calicut and an Egyptian fleet at Diu in 1509, the supremacy of the sea passed on to the Portuguese, and thence on the other European nations for the next four centuries. It does not, however, mean that "The Lords of the Sea" established an undisputed mastery over the sea

coasts of India. For well over 90 years the Zamorin's fleet held its own in the home waters of Calicut. The architect of this relentless fight against the Portuguese was the Zamorin's Admiral Kunjali, who for 40 years, defied the might of the Portuguese Navy and won several notable battles against them. His tactics were to subject the Portuguese fleet to intense harassment and avoid a decisive engagement. In his effort to free the sea from the authority of Portugal, the Zamorin made an alliance with Turkey. In pursuance of this arrangement, Suleiman Pasha Al Khadim, the "Begler Beg" of Egypt (then a colony of Turkey) received the following instructions from Sultan Suleiman, The Magnificent:—

> You who are the begler beg of Egypt, Suleiman Pasha, immediately on receipt of my orders will get ready your bag and baggage and make preparations in Suez for a holy war and having equipped and supplied a fleet and collected a sufficient army you will set out for India and capture and hold those ports cutting off the road and blocking the way to Mecca and Medina; you will avert the evil deeds of the Portuguese infidels and remove their flag from the sea.

The Egyptian fleet appeared in the Indian Ocean off Diu but beat a hasty retreat back to Egypt when confronted with the Portuguese fleet under Martin de Souza. However, Kunjali continued his relentless pressure on the Portuguese and in 1564, he destroyed the Portuguese ships in the harbour of Cannanore. This roused the Portuguese into sending a force against Kunjali who pounced upon a squadron of ships under Dom Paulo de Lenia at the Bay of Bhatkal and gained a complete victory. Dom Paulo himself was wounded in action. Kunjali gained another notable victory in 1569 over Dom Martino de Miranda who was wounded and carried off to Cochin where he died. This victory encouraged Kunjali to sail north to Diu where he gained victory over a squardron commanded by Ruy Dias Cabral who was killed in this action.

Kunjali died in 1595. This left the ocean open to the Portuguese and later to the French, the British and the Dutch. The hero of a thousand fights who defied the 'Lords of the Sea' for over 40 years, and whose courage and knightly courtliness was admired and attested even by his enemies; Kunjali was undoubtedly one of the greatest figures in Indian Naval history. Befittingly, the Indian Navy of today has commissioned an establishment at Bombay known as INA Kunjali to perpetuate the memory of this gallant Admiral.

The Portuguese at this time were led by an intrepid mariner, Alfonso D' Albuquerque, surnamed the Great, whose fame and exploits ranged from Ormuz in the north to Cochin in the south, from Malacca in the east to Mozambique in the West. In 1510, after an unsuccessful attack on Calicut, Albuquerque headed for north and annexed the territory of Goa, which was to remain for some 450 years the capital of Portuguese posses-

sions in India. Albuquerque was the founder and the architect of the Portuguese Empire in Asia, and after his conquest of Goa with apparent glee, he boasted in a letter to King Manuel the Fortunate: "Afterwards I burnt the city and put all to the sword....Whenever we could find them, no Moor was spared and we filled the mosques with them and set them on fire."

In December 1961, India decided to liberate the Portuguese possessions and thus remove the last traces of colonial rule on the Indian mainland. By a strange turn of events on 18th December 1961, the flagship of the Portuguese Asiatic Squardron was the 1,700 ton destroyer bearing the name of none other than the conqueror of Goa—Alfonso D'Albuquerque. This ship, wearing the flag of Commodore Antonia Cunha Aragon, with steam raised, anchor cable ready for slipping and guns manned, was in Marmagoa harbour. At noon, the Commodore was ordered to surrender, whereupon the ship slipped her anchor and tried to head for the open seas. Two Indian frigates headed her off and a short sharp engagement ensued in which the *Albuquerque* was badly damaged and caught fire. With her Commodore wounded the ship beached herself. The officers and crew abandoned the vessel and were taken prisoners the following day. Unlike the Portuguese Mariner of old who 'burnt the city and put all to the sword', the Indian Forces treated their adversaries with chivalry and consideration.

RISE OF MAHRATHA NAVAL POWER

Realising the importance of sea power, Shivaji, the founder of the Mahratha Kingdom on the West Coast of India, ordered a naval force to be formed. Between 1659 and 1664 a naval fleet with 500 vessels was fitted out with a series of bases on the Konkan Coast. The first operation undertaken by this force was the capture of the island of Khanderi situated near the entrance to Bombay Harbour. The English joined forces with the Sidis but failed to dislodge the Mahrathas from the island. In 1683 the Mahratha navy captured Kolaba, Swarnadrug and Vijaydrug which was turned into a strong naval base. In 1698 Admiral Kanhoji Angre took charge of the Mahratha fleet and it was under him that some very impressive naval engagements were fought against the British. His name was to become legendary in the annals of Indian naval history. His tactics were similar to those of Kunjali. He operated with a large number of light speedy craft; like wasps they would surround heavier and sluggish vessels and attack them at close quarters. Due to the threat by Kanhoji, the Bombay Council under the British started a system of convoying their ships. In 1717 the British Governor of Bombay, Charles Boone, equipped a fleet to attack Kanhoji at Vijaydrug, but it was a miserable failure. In the following year, the Bombay fleet reinforced by a squadron of three ships from England and 2500 soldiers attacked Kanhoji at Khanderi but this

force was also almost wiped out and the fleet was forced to withdraw. This reverse stung the British into renewed effort. They appealed to the King for naval help in order to wipe out once and for all this threat to their plans of annexation of India. A squadron of the Royal Navy under Commodore Mathews was duly despatched and arrived in Bombay in October 1722. They joined hands with the Portuguese and the most elaborate preparations were made. A powerful force of 5000 men with 24 field-guns supported the units of the Royal Navy. They attacked Kolaba and the attack ended in an inglorious failure. The Portuguese fled and the British were forced to take refuge in Bombay, after losing most of their guns and ammunition. This was Kanoji's crowning success which made him the unchallenged master of the Konkan Coast. In 1724 the Dutch tried their mettle against Kanhoji by sending seven warships, two bomb vessels and a body of regular troops to attack Kanhoji's fort at Gheria (Vijaydrug), but were also beaten back. In the words of English historian Kincaid: "Victorious alike over the English and the Dutch and the Portuguese, the Maratha Admiral sailed the Arabian Sea in triumph." In 1729, with the death of this great Indian naval hero, the achievements of India on the high seas passed into obscurity. It saw the emergence of British authority in the Indian seas which virtually turned the Indian Ocean into a 'British lake' with their control firmly established on the gateways into the Indian Ocean both from the East and from the West. This authority remained unchallenged till 1941. In memory of the hero Kanhoji Angre, the Indian Navy has commissioned a premier naval establishment in Bombay 'INS Angre'.

SHIPBUILDING IN INDIA

If the Indians had ventured into the sea as early as 1000 B.C., it is but logical to assume that the knowledge of shipbuilding would also date back to the same period. As long as construction was of wood, Indian-built ships compared favourably with those produced in Western countries, as Indian ships built with teak wood were considered superior to oak wood used by the shipbuilders in the West. The Portuguese and the British, out of necessity had to depend on local facilities for repair and construction of their ships. The family of Wadias, the Master shipbuilders of Bombay, turned out a number of cruisers for the Royal Navy. Ships built by this firm formed part of Nelson's fleet at the battle of Trafalgar in 1805. The oldest ship afloat today, HMS, "Foudroyant" harboured in Portsmouth and used as a training ship was launched from Bombay harbour on 12 October 1817.

It was on the advice of Wadia that the present site of the Naval Dockyard in Bombay was selected by the British. Lord Wellesley was of the opinion that Indian-built vessels were far less expensive than the British ones and was a supporter of the policy of encouraging ship construction in India. However, this competition from India created grave misgivings

amongst the London Shipbuilders and Indian shipbuilding industry was not encouraged. The Industrial Revolution from wood to iron, and from sail to steam, sealed the fate of shipbuilding industry in India, until World War II when force of circumstances brought about its revival by the British. Since Independence, there is a definite urge on the part of the Government to encourage ship construction in India and the Hindustan Shipyard Ltd. at Vishakapatnam and the Mazagaon Docks at Bombay have come into being.

THE FUTURE

Soon after Independence, the military problems facing India were of a nature which focussed attention on the Army and the Air Force, the Navy being relegated to a comparatively lower priority. However, in the last decade, there has been a growing realization amongst the general public and policy-makers of India, of the importance of a strong naval force. The lesson of World War II has not been lost upon them. The sudden appearance of a Japanese fleet in the Bay of Bengal after the fall of Singapore posed a serious threat to India's security and demonstrated once again, how much it depended on mastery of the seas. China has emerged as a powerful nation with expansionist tendencies in the East and has posed a serious threat to India's security from the same direction. The British Navy with the help of strong bases on the mainland of India and Ceylon, and by controlling the entrances and exits to it had turned the Indian Ocean into a 'British Lake'. The gradual withdrawal of British sea-power from the Indian Ocean makes it imperative for India's naval power to assume full responsibility for providing security to her growing shipping and her long coastline. Has the wheel of fortune of India's maritime power turned a complete cycle? If so, India may well emerge once again as a dominant naval power in the Indian Ocean, and make it truly Indian in character. The dominant position that the Indian sub-continent occupies in the Indian Ocean and the necessity for security of her island territories both in the Bay of Bengal and the Arabian Sea, lead one to this logical conclusion.

THE ANATOMY OF AN INDEPENDENT AIR FORCE

By Commander M.K. Roy

Bull fight critics sat in rows,
Crowding the enormous plaza full;
But only one man is there who knows;
And he's the man who fights the bull;

PROLOGUE

Warfare is three dimensional—land, sea, and air. However, countries are locked in battles either on land or sea with the media of air governing what goes on below. Because of this quality of permeation over the other two elements, the control of operations in the air cannot be separated from either land or maritime operations. The role of the aeroplane is therefore basically to support ground troops or naval forces. As the noted military writer, Major General Fuller stated that unless air power is integrated with sea and land forces, in themselves Fleets and Armies loose the greater part of their fighting values.

BIRTH OF AN INDEPENDENT AIR FORCE

HISTORICALLY in Britain there was the Army Air Corps and the Naval Air Service. This organisation continued all through the First World War. The Royal Flying Corps under Major General Trenchard forming an integral part of the British Expeditionary Force and the Roval Naval Air Service employing over 3000 aircraft functioning in support of naval operations although stifled by the pure bread sea-dogs who only believed in naval guns being the basis of maritime strategy. They were, therefore, subconsciously sympathetic to Trenchard's plea for the formation of an independent bombing force in order to get rid of the aeroplanes from their beloved men of war. In 1919, General Mitchell bombed the vintage German battleship *Ostrfiensland* anchored off the Cape Verdes and sank the decrepit old lady. Armchair strategists mushroomed overnight and roared themselves hoarse in Parliament and flooded newspapers with their demands for a more effective Air Force. The Smuts Committee was appointed which, except for a single airman (Sir David Henderson), consisted of only 'Bullfight Critics' mesmerised by the prophets of air power—Billy Mitchell and Guiulio Douhet, who proclaimed with supreme confidence that one attack by a massed flight of bombers could annihilate a city and effect the capitulation of an enemy without a single shot being fired by either the Army or Navy! The

seeds of this gigantic hyperbole was truly and deeply sown. The Royal Naval Air Service and the Royal Flying Corps were sacrificed for an Independent Air Force to be presided over by Trenchard who changed from a General to an Air Marshal. Thus was born the Third Service in the Defence Forces. In its wake, crept in a cacophony of Joint Committees, Joint Staffs and Joint Commands which contrived to bring the three Services to battle under a unified direction, if not unified control.

In Germany, the Luftwaffe depended on its independence on the personal relationship of Goering with Hitler. The Fuhrer's General Staff and Grand Admirals had little control over their air components. Consequently the German U-boats were denied adequate aerial intelligence. The powerful battleships of the Third Reich never hoped for air cover and hence operated surreptitiously as raiders taking advantage of the weather to break out into the Atlantic at a time when the German Air Force ruled the skies! The vain boast of Goering to supply the encircled German Army from the air at Stalingrad only resulted in the surrender of Field Marshal Paulus due to lack of supplies which marked the beginning of the end of the *Wehrmacht*. The *Luftwaffe* had in the mean while lost the Battle of Britain, prevented the escape of the British Forces at Dunkirk and in addition had failed to give adequate air cover to the other two services in its endeavour to provide a third seraphin in the heirarchy of the Armed Forces.

The Japanese torpedoed the United States battleships at Pearl Harbour and compelled America to base her strategy on carrier aviation which led to perhaps the biggest air engagements of the war far from the cynosure of any independent air force. The Marine pilots striking success in their close support of the assault forces was not only due to their courage and flying ability but also to the one cap badge system between the Marine flyers above and Marine assault forces below on the beaches. Carrier aviation supported naval forces and the Army Air Force stepped in to provide air cover for their ground forces immediately airfields were bulldozed ashore. The Independent Air Force was only formed after the war when the need for strategic bombing and the delivery of the Atom Bomb dominated military strategy. This was as close as Seversky's and Douhet's theory of strategic bombing to win a war single-handed ever came within the purview of reality. With the shooting down of Garry Powers in his high-flying spy aircraft over Russia by a guided-missile and the perfecting of air warning and tracking systems, the air-launched deterrent gave way to the Polaris missile which was delivered from the womb of the protective oceans by a nuclear-powered submarine. The Inter-Continental Ballistic Missiles, the deployment of nuclear submarines and the strike capability of the aircraft carriers of the Sixth and Seventh Fleets dispossessed the Strategic Air Command from being the solitary apostle of America's global strategy.

Let us now look at the U.S.S.R. Russia has only two services—the Army and the Navy. The air-space is divided between them both and air support tailored to meet their respective requirements. There is no separate air force and hence no need for compromises nor inter-service committees to keep up the battle of the files. The Army controls all the sinews of the land battle and the Navy, with no carrier aviation, still is the sole partner in maritime operations. Perhaps the Russian mind is allergic to Government by Committee. Perhaps their military machine has been forged on the anvil of survival. But whatever be the reason, it has been proved beyond doubt that the outcome of battle was neither dependent on inter-service co-operation nor based on inter-service compromises.

THE LIMBS OF AN INDEPENDENT AIR FORCE

Now let us take a closer look at the anatomy of the Indian Air Force. Based on the British system and initially commanded by Hugh Trenchard's disciples from the Royal Air Force this tiny air force consisting of phased-out front-line aircraft became the sole repository of air power on this sub-continent, combining under its leaky umbrella all the requirements of the Army, Navy and Air Force. The capability of her fighter ground attack aircraft only impressed the thousands of Bombay citizens, clad in their dhoties, who enjoyed the caning of the taxpayer by the IAF fire-power demonstration at targets chained in the sea off Marine Drive. None the less the army persevered in their complaint regarding the lack of air support and even more the lack of control over the air component in battle. This inevitably generates mutual recrimination in all countries where an independent air force requires air control teams, air liaison officers and air force elements to translate army jargon into air force vocabulary! However, the spectre of air-raids over Delhi continued to cash successive Air Force budgets and the *camaraderie* between her and the other two Services were tacitly relegated to ceremonial parades till they were tested in battle.

Strategic bombing of enemy cities in turn drew instant applause in coffee-houses from those taxpayers who perhaps had not learnt from hind-sight that in spite of the 1000 bomber raids on the Ruhr in 1944, it was established by the Allies after the war that production during this period had actually increased! The less said of the present deterrent effect of a pocketful of bombers purchased by underdveloped countries the better!

Further IAF transport aircraft were only sufficient to meet a part of the requirement of the Armed Forces. Private air charter companies filled in the void perhaps with greater utilisation of aircraft and aircrews. This is akin to that of merchant ships which are diverted during war to bring in supplies of ammunition and military hardware. Should the air-transport of military stores and personnel be the major task and the monopoly of a combatant Air Force?

As regards Maritime Patrol aircraft, this topic is currently *sub judice* and perhaps will remain so until the hard lessons of battle on the high seas are brought home to the 'bullfight critics' who do not wish to rock the apple cart of so-called inter-service co-operation. The result is that the Navy has little control of the aircraft required to scour the oceans and ferret out the enemy. This ostensibly Naval requirement paradoxically continues to be undertaken by the Air Force whose pilots are environmentally orientated to braving flak and fighters rather than water and weather. The ensuing lack of naval control over Maritime patrol aircraft at sea has resulted in the anachronism of dual responsibility illustrated by command and control compromises such as 'distant support' and 'indirect support'. Even Britain placed Coastal Command under the Royal Navy during the last war and to date she is the 'odd man out' among a host of countries including U.S.A., France, USSR, Germany, China and Indonesia whose maritime air squadrons are an integral part of the Navy.

It was clear from the hind-sight of the last war that without air-cover, surface ships were vulnerable to air-attack as demonstrated by the sinking of the unsinkable battleships *Prince of Wales* and *Repulse* off Singapore by Japanese aircraft. The Indian Navy therefore sought to acquire an aircraft carrier within her paltry share of three per cent of the Defence budget in order to provide a self-defence against an air-attack at sea and in addition to extend the hitting range of the Fleet to almost ten times that of the conventional gun. Even this singularly straightforward naval requirement was fought with pathological obsession by the IAF oligarchy in Ministries, Clubs and Bars of New Delhi as they believed in the delusion that the Air Force were the only cross-bearers of air power on this satellite. It was only the steadfastness of Nehru that led to India acquiring an aircraft carrier which the B.B.C. in their broadcast during the last Indo-Pakistan war stated 'could alone turn the balance of power in an ocean significantly named the Indian Ocean'.

THE OPERATIVE SURGERY

It is therefore necessary to undertake a mind-clearing surgery and carve out a more efficient and integrated fighting machine to hit the enemy more effectively without indulging in Parkinson's Law of yet another service with its duplication of men and material making further inroads into the Defence Budget.

The thesis that the army should have their own Air Corps to support their infantry, artillery and armour brooks no logical anti-thesis for economy and effectiveness in battle. Therefore, all Fighter Ground Attack Squadrons which form the major component of the IAF should be transferred to the Army for the more effective support of their ground forces.

Bomber command will perhaps never again be the sole repository of

the nuclear deterrent. Further, the splendid hoax of strategic bombing and the credibility of the bomber-offensive has been truly and rightly nailed during the past war analysis of bomb damage. As the eminent defence scientist Professor Blackett said: "the diversion of any appreciable fraction of a country's total air effort to strategic bombing will only lead to extremely small returns". Hence the glamorous theme of an independent bomber offensive must perforce be related to the unpalatable requirements of military employment. It is also obvious that the main task, especially of tactical bombers, is to act in conjunction with the ground forces. It is therefore not heresy to suggest that this IAF component should also form part of the Army Air Corps.

The Indian Air Force still retains control of the Cinderella of their service, viz., the maritime air squadrons which continue to lead a precarious existence uncared for by the fighter boys who dominate the Air Force and unwept for by an exasperated Navy who are denied full responsibility for maritime operations. The transfer of the maritime squadrons to the Navy which is inevitable in war would in turn prevent the Navy from passing on the blame for any of their failures on the high seas to an Air Force firmly based on terra firma!

The encouragement to nationalised air lines and private air freight companies to carry a volume of military personnel and stores on the same analogy of the merchant marine will encourage aviation and allied aircraft industries in India. In addition, this will help to remove the present anomaly of aviators recruited for combat being employed exclusively to crew non-combatant planes and the resultant periodical purges of pilots and navigators to the Air Lines and crop spraying companies.

EPILOGUE

Changes are now a permanent feature of military life. Canada has resorted to sweeping changes to unify all the three services. In USA, a Strike Command has been created integrating the Army and the Air components under a unified Army Command. It is therefore not revolutionary for India to attempt to reorganise her Armed Forces for greater effectiveness in battle. The continuance of a system formulated three decades ago is perhaps a tribute to our resistance to change or perhaps our incapacity to reorganise our military structure to keep pace with the changing patterns in the organism for conflict. The Army and Navy must logically have their own integrated air arms to fully support their requirements in combat without resorting to brokers and middlemen to answer their pleadings for air support. This integration of the Air Force with the other two services will alone prevent the man who is fighting the enemy from looking up at the still empty skies for the air support promised by an Independent Air Force and asking in despair—Independent of whom?

DEFENCE IN PARLIAMENT

FROM A SPECIAL CORRESPONDENT

WITH the political developments in West Bengal and Haryana and the language controversy engrossing popular attention, defence, for the first time in several years took a comparatively back seat in the winter session of Parliament. During the years after the Chinese attack in 1962, Parliament proceedings had a strong overtone of defence. The Pakistani aggression of 1965 heightened this interest. During the last session, however, this was not so. Too much had happened or was happening at home. The winter session was therefore almost exclusively concerned with domestic issues. Defence and External Affairs were relegated to the background, not only during the debates but even during the Question Hour.

On the opening day of the Lok Sabha session some forty members, some of them stalwarts, from the Congress and the Opposition benches, had given notice of a question about the Chinese firing at Nathula in September and at Chola in October. While the Government had from the start treated these as local incidents, the firing had caused considerable concern at home and abroad. What could be the Chinese intentions? To test Indian defences? Provoke India? Or did they want to divert attention from the worsening conditions inside China by mounting another limited attack?

In his reply the Defence Minister, Mr. Swaran Singh, gave an account of the Chinese intrusions which had taken place on the Sikkim side of the Tibet-Sikkim border in August. The Nathula firing started by the Chinese on September 11 continued till September 14. At Chola, they fired on October 1, following a scuffle with an Indian jawan in a position which had always been in Indian occupation. Indian casualties, he said, were 88 killed and 163 injured. Though exact figures about Chinese casualties were not known, it is estimated that nearly 340 Chinese were killed or wounded in the two incidents. Indian troops, he said, dealt with the Chinese provocations in a calm and cool manner but when the Chinese resorted to unprovoked firing, they gave effective replies. The Defence Minister said that at no time did they lose control of any military post to the Chinese, and but for the fact that the Chinese had treacherously attacked on both occasions, Indian casualties would not have been so high. There were also questions in the Rajya Sabha about these incidents.

Members in both Houses seemed satisfied with the resolute manner with which the Armed Forces had handled the situation as also with the firm but dignified manner with which the Government had treated these

incidents. But not for long. A week later, the Defence Minister was closely questioned in the Lok Sabha about the document signed by an Indian Officer, Maj. K.V. Chandrasekharan, while taking over bodies of Indian personnel from the Chinese. Mr. Swaran Singh told Mr. Madhu Limaye (SSP) that the officer had signed the document in good faith thinking that he was merely giving a receipt for the bodies but the Chinese had exploited the document.

This touched off protests from the members. Mr. Nath Pai (PSP) said Indian Armed Forces had given a good account of themselves in the two incidents, but he asked why there were only Indian bodies in Chinese possession and no Chinese bodies in Indian possession. The Defence Minister explained this by saying that this was because the Chinese had launched a surprise attack in the initial stages. He rejected a suggestion made by Mr. Bal Raj Madhok (Jan Sangh) that Indian troops stopped firing because the Chinese threatened to use their Air Force. Replying to a question by Prof. D.C. Sharma (Congress) he denied that China had grabbed Sikkimese territory during the two incidents. He told Mr. Limaye 'I will be frank in saying that the officer should have been more careful. He signed in good faith but he should not have presumed that the document was merely a receipt'. Mr. Atal Bihari Bajpayee (Jan Sangh) wanted to know if Government had instructed the commanders not to take Chinese prisoners or keep Chinese dead. This brought forth a categorical reply. Mr. Swaran Singh said that there is no question of Government laying down a policy like that. It is for the local commanders to decide what they should do as circumstances permit.

Connected with the Nathula and Chola incidents, is the subject of Chinese concentration on Indian borders. A number of questions were asked about this as also about Chinese intrusions. The Defence Minister told Lok Sabha that the Chinese continue to be in strength along the country's Northern borders and the Tibet—Sikkim border. They have strengthened their positions in the Chumbi Valley area. In reply to another question, the Defence Minister while reiterating this, denied that there had been any significant increase in Chinese strength on the North Sikkim border in recent months. The Defence Minister told Rajya Sabha that the Chinese had intruded 11 times in Sikkim, 4 times in Ladakh and once in NEFA between May and October last year. They were comparatively small localised incidents, he added.

Questions were also asked in Parliament about China's nuclear capabilities. The Defence Minister said that it was believed that China could produce about 40 nuclear bombs every year and could be expected to have stockpiled about 100 bombs of 20 kilotons capacity already. China, he said, was placing considerable emphasis on large-scale production of medium range missiles capable of delivering atomic war-heads. Reports

show that she has already completed the development of a medium range ballistic missile and will probably achieve an operational ICBM capability before 1972.

Allied with China's capabilities is the question of her collusion with Pakistan and the Pak military build-up. The Defence Minister told Parliament that since September 1965, China was known to have supplied Pakistan complete equipment for two infantry divisions, about 250 tanks, 120 Mig-aircraft and two squadrons of IL-28 bombers. China is known to have given Pakistan hundreds of millions of dollars mainly for purchase of military hardware, large number of artillery pieces and vehicles, large quantities of ammunition, spares for tank and aircraft and assistance for setting up Ordnance Factories. The Defence Minister said Pakistan was also acquiring from France Mirage supersonic Fighter aircraft and two submarines. M.P.s expressed concern during Question Hour at the continued discovery of Arms dumps of foreign make in J & K and Rajasthan. They were informed that 35 spy rings had been unearthed in J & K since the Tashkent Agreement.

In the Rajya Sabha, the Goverrnment was closely questioned about India's Defence preparedness, when it was disclosed in reply to a question by Mr. Lok Nath Mishra that Pakistan continued to be in occupation of some isolated pockets on the Indian side along the Cease-Fire Line in the Kargil sector which the Chief Military Observer had asked her to vacate. The Prime Minister had to intervene once to explain the position. It had already been made clear that Pakistan had vacated all areas occupied by her during the Indo-Pak conflict of 1965. Questions were also asked about the Pakistani attack on an Indian patrol in the Uri sector on October 9 in which two Indian jawans were killed and some eight Pakistanis are believed to have been killed or wounded. In reply to a question in the Lok Sabha, it was revealed that Pakistan had violated Indian air-space in J & K, Punjab, Gujarat and in the Eastern sector and that Pakistan had violated the Cease-Fire in J & K on more than three thousand occasions since the Tashkent Agreement. In the larger context of Pakistan's military build-up the Prime Minister said India had pointed out to the USA that the lifting of the embargo on the sale of spares of lethal weapons to Pakistan, would lead to the increase of tension in the sub-continent. The United States, she said, had replied that the sales would be made after strict scrutiny on a case-by-case basis and that sale of spares for equipment already supplied would not lead to an arms race. Members also raised the issue of new military arrangements between Pakistan and the United States and the reported take-over by Pakistan of US military bases in that country. Government gave the assurance that no new military arrangements had come to Government's notice but a careful watch was being kept.

INDIA'S DEFENCE PREPAREDNESS

On the broad question of the country's march towards self-sufficiency in defence requirements, a statement was made on behalf of the Government in the Lok Sabha. Of the four new factories envisaged, two, for Small Arms and Ammunition, had begun production and the other two for shells and filling are in various stages of development. Ordnance Factories had been geared up and new lines of production had been started. The Heavy Vehicles Factory has commenced production and one for the manufacture of trucks is likely to do so in 1969-1970. The first Indian made frigate is expected to be commissioned in 1971. The value of defence equipment manufactured in various undertakings in the last final year was 193.54 crores.

Two aspects of Defence Production seemed to have attracted particular notice from the members. These were electronics and aircraft production. A large number of questions were asked about the working of Hindustan Aircraft and Bharat Electronics, with particular reference to the manufacture of television sets within the country.

Parliament was informed that Bharat Electronics have been entrusted with the planning of a factory for radar and micro-wave equipment. The Project report is expected to be ready by June. Bharat Electronics manufactured valves worth Rs. 4.85 crores till the end of September, of which valves worth Rs. 4.30 crores were sold. The company manufactured in the last financial year defence equipment worth more than seven crore rupees. This year this is likely to rise to eleven crores. The expansion programme envisages a production of Rs. 22 crores.

Parliament was informed that the country is likely to achieve self-sufficiency in electronic equipment required for the defence forces by 1971 and for other purposes four years later.

Manufacture of television sets within the country was expected to start in the middle of 1968. A pilot project set up by Government is already manufacturing sets. By the end of the next financial year some ten thousand sets would be manufactured within the country. As for radio receivers, a target of manufacturing 36 lakh sets by 1970-71, has been fixed.

The questions about aircraft manufacture naturally related mostly to the manufacture of Mig and HF 24 aircraft. Some Parliament was informed, have already been delivered to the IAF. The Nasik Hyderabad and Koraput Mig factories would be substantially completed in 1968. A little over twenty-five crore rupees had been spent on these factories till the end of the last financial year. Flight development, trials are being conducted in the UAR to match an engine for the HF 24 plane manu-

factured by HAL. It was also revealing to learn that HAL exported components and aero-engines to the U.K. Their total exports so far amount to £ 90,000. HAL have obtained type certification and clearance for the pneumatic air starter for jet engines.

Not that Parliament only concerned itself with matters of national interest. Members also asked a number of questions about the welfare and amenities of Service personnel. The fate of demobbed Emergency Commissioned Officers, pension rules, rehabilitation of ex-servicemen and ex-INA personnel were all covered during question hour. In reply to one question, Parliament was informed that Government has an ambitious Rs. 290 crore plan to provide housing for officers and men in non-family stations. The programme is to be implemented in ten to fifteen years.

TRADITION

By Major-General J.D. Lunt, CBE

THERE has been some interesting correspondence published recently in this journal on the subject of tradition in the Indian Army, and it has reflected two opposing schools of thought. On the one hand, there are those who regard much of the army's tradition as a legacy of the British, and as such alien, unsuitable, and ripe to be discarded; while there are others who argue that an army's tradition is not made solely by officers, British or Indian or any other nationality for that matter, but is the result of a joint effort by all ranks, and for this reason it would be a disaster to abandon traditions that have been built up over the years. It is not my intention to identify myself with either school of thought, and least of all to convey the impression that I, as a British officer, have some kind of vested interest in perpetuating traditions to which my forbears have in some measure contributed. Instead I write as an amateur military historian, who has always taken a keen interest in Indian history, and with the object of stripping the argument of emotionalism and trying to put it into some kind of perspective.

In the first place, what is tradition? The *Oxford Dictionary* defines it as 'opinion or belief or custom handed down from ancestors to posterity.' It defines customs as 'usual practice', and sentiment as 'a tendency or view based on or coloured with emotion'. I would suggest that we very often confuse these three words—tradition, custom and sentiment. For example, customs followed in officers' messes, such as passing the port, not mentioning ladies' names in the mess, and so on and so forth, are hardly traditions. They are customs. The pre-Independence Indian Army was created in the British image so far as its officers were concerned, and social customs which were observed in the British Army at that time were naturally followed by British officers serving in the Indian Army. Some customs, such as that of officers wearing swords in mess—the Worcestershire Regiment—had their origin in some wartime episode, but most of them reflected the British way of life in the last century. As such many of them have long since been discarded, while others are on the way out.

When I first joined my regiment in 1937, we dined in mess-kit four nights a week, and were expected to be present unless we had a very good excuse for the contrary. Supper nights were Sundays and then we could wear suits. On Wednesdays and Saturdays we were allowed to wear dinner jackets. None of this applies today. In most British regiments mess-kit is only worn on guest nights, and these seldom take place more frequently than once a month. Ladies used to be forbidden to enter the mess, except

on special occasions, but here again they are included nowadays in many mess functions. Custom has in this case given way to modern attitudes of mind, since few people want to spend hours every night sitting round the dinner-table in an uncomfortable uniform, and women everywhere are becoming more and more emancipated.

These mess customs do not represent tradition for me. When I went out to Aden in December 1961 to take over command of what is now the Army of the South Yemen Republic (then the Federal Regular Army), I found that at least one British commanding officer expected his Arab officers to attend a ceremonial dinner night two or three times a month, and pass the port round the table. The Arabs were very strict Moslems, and I knew it was distasteful for them to be in any way associated with alcohol. Equally I knew, from past experience, that this very British form of entertainment was alien to their own way of life. So I soon put a stop to this. When we dined together, which we frequently did, we did so in accordance with Arab customs. There was no need to require them to adopt British social customs which in any case owed their origins to the days of Queen Victoria, and not to those of Queen Elizabeth II.

Sentiment can be equally reactionary in its effects. The love of the cavalryman for his horse delayed the mechanization of the British and Indian Armies, and also the German Armys'. The British Secretary of State for War, when informing Parliament in 1936 that it had been decided to mechanize eight cavalary regiments, felt constrained to apologise in these words: "It is like asking a great musical performer to throw away his violin and to devote himself in future to the gramophone." I am quite certain that when the tank in its turn becomes obsolete, its protagonists will defend its retention in equally extravagant language. Nor is sentiment confined to soldiers. The Royal Navy fought for years for the retention of the battleship, or at least some of its senior admirals did, arguing that the battleship would always be a match for the bomber aircraft. We saw the fallacy of that argument exposed when 'Prince of Wales and 'Repulse' went to the bottom in the Gulf of Thailand in December 1941. One could quote many other examples, but these two will suffice.

I submit, however, that regimental tradition is quite different. It is made by everyone in that regiment, and not by just the officer or soldier concerned. Subedar Richpal Ram's heroism at Keren has become part of the tradition of the Rajputana Rifles—something to be cherished throughout the ages as an example to all who come after, be they officers or jawans. The conduct of the 4th Bn of the Sikh Regiment at Saragarhi, when they were known as the 36th Sikhs, and were under British command, owed nothing to the presence of British officers. There were none present. It was a magnificent example of soldierly valour and as such must be an inspiration for all past, present and future 4th Sikhs.

The late Frank Majdalany, writing of the 4th Indian Division at the battle of Cassino in Italy, had this to say of tradition:

> "Under-supplied, without sufficient time to prepare, these few fought a lonely battle in the mountains and no one in the rest of the army had any idea that they were fighting. They had nothing to sustain them except that potent imponderable their regimental identity. It mattered to the Rajputana Rifles that they were Rajputana Rifles. It mattered to the Royal Sussex that they were Royal Sussex. In the end it was probably this alone that enabled them to hang on."

It may seem strange, or even undesirable, to the younger generation of Indian officers for the Indian Army to perpetuate traditions which in some instances owe their origin to battles fought in India by Indians against Indians, but surely the prime military virtues of loyalty, discipline and courage are what make tradition, whether it be at Seetabuldee or at El Alamein, in the lonely wastes of Ladakh, or on the frozen heights of the Nathu La. These are the traditions worth preserving because they cannot be built up in a night. I have had experience of serving with soldiers who lacked these traditions to inspire them in adversity, and I have never since doubted their value.

General Charles de Gaulle, in his "Army of the Future", wrote:

> "The army in general is an entity so vast that its members can hardly visualize it as such. But the Regiment can be seen, can be measured, can be understood. A man has his own place there. He can be recognised there among others. Of a soldier, the first thing one says is 'he is in such and such a regiment.' Moreover, the emotional side of the profession finds something to feed upon in this organic grouping. The desire which is felt by the weak, mediocre, transient individual to participate in the power, the greatness, the permanence and the splendour of a famous regiment is exciting and satisfying. In addition, the aesthetic character of military affairs which appeals most strongly to the senses is most clearly seen by the soldier in the regiment; impressive spectacles in which he is allowed to take part, thrilling symbols which he is privileged to see and to touch, stirring bugle calls, and music in which sings a soul with which his own mingles."

Every army undergoes a radical reorganisation from time to time. This may be forced on it through changes in weapon systems, and a consequent change in tactics and organisation. It may come about for economic reasons, or may be caused by changes in national policy. A regiment may change its number, its name, its dress, its equipment, but the tradition bequeathed to it by those who went before, and jealously guarded by those who serve in it now, will carry it safely through all such changes. As the years pass traditions which derive from the distant past give way to more recent ones—already battle honours of the First World War are distant in our memories. It will soon be the same with 'Keren', 'Cassino' and 'Meiktila'. This does not matter. It is the tradition that has been handed on by the men who

fought and won those battle honours which inspires those who come after to do equally well.

Of course, every country, and every army, can delve back into its past and produce battles which are, perhaps, more wholly national in character; like the battles of Panipat for India, or the battle of Agincourt for Britain, or of Tours for France. But in those days armies, for the most part, were not the disciplined organisations they are today. The British Army traces its beginnings as a regularly constituted force to as remotely as 1668; the French Army goes back a little further in history; the modern Indian Army to the raising of what is now the Madras Regiment in 1758. To go back much further than this in history is to mix sentiment with tradition, although naturally Indians take as much pride in the achievements of, say, Shivaji, as the Scots do of Robert the Bruce, the Swiss of William Tell, and the Greeks of Xenophon.

The great advances in modern technology sometimes lead us to forget that the weapon, however efficient, is only as good as the man who operates it. The finest tank in the world is only an iron box if its crew lack discipline, courage and training. Ardant du Picq wrote that "the man is the first weapon of battle; let us then study the soldier in battle, for it is he who brings reality to it. Only study of the past can give us a sense of reality, and show us how the soldier will fight in the future." These words are as true today as they were when du Picq wrote them during the last century. A study of past battles shows that men have time and again been inspired above and beyond the call of duty by the traditions of their unit. No army in the world has finer traditions than the Indian Army has to sustain it in battle, and these traditions must surely be worth preserving. The problem does not lie in scrapping these traditions, or in trying to evoke from the distant past traditions to replace them, but in trying to distinguish between tradition and what is only social custom or sentiment.

MILITARY EVALUATION OF SEAS AND OCEANS AND THE GEOGRAPHIC BASIS OF SEA POWER

By Bikash B. Basu

THE seas and oceans are the great highways for the flow of men, materials and ideas. All through the past the sea-ways have played a very significant role in the dissemination of cultures, in widening the horizon of trade, and in the settlement and economic development of distant lands. In some respects the sea-ways have enjoyed certain advantages over other means of circulatory systems on account of economic, technological and security reasons. Even after technological revolutions in the field of transportation the cost of transporting goods per ton per mile is lower by the water route than by other means. From the technological point of view the sea-ways presented less problems in hauling bulky and heavy commodities, as well as large numbers of men and large quantities of materials, over long distances in comparison to the problems posed by such movement over land or through the air. The technological problems of transhipment over difficult terrain, like deserts, mountains, jungles and swamps, can only be solved at enormous cost even today. From the days of sailing ships to the present day the technological progress in the field of acceleration of movement, bulk handling of cargo, preservation of stores over long haulage, have been maintained by water transport over other carriers of goods. The water route has also enjoyed a greater degree of security from anti-social, political and military interference. In spite of the romanticism attached to the great Silk Road from China to Europe and the geopolitical and military significance of the Trans-Siberian railroad, there are few such examples of trans-continental land routes which can function without political and military interference. The great sea-ways, on the other hand, enjoy a greater degree of freedom from interference, even in war time.

GROWTH OF SEA TRAFFIC

Over the centuries the alignment of the trade routes across the seas and oceans have undergone changes. The density of traffic, the character of trade and the direction of the shipping lanes, have changed in response to technological and economic changes. Prior to the introduction of steam-power the alignment of the sea lanes was determined as much by the economic significance of the hinterland of the trading posts and by the direction of prevailing winds. The economic development of many parts of the world remained unconnected from the main stream of international economic

growth as the sailing ships could not reach such areas owing to the vagaries of wind and weather. Later, with the invention of steam-power, the railroads linked up the hinterland with ports, and the steamships, being liberated from servitude to prevailing winds, could call at any port in the world. New trade routes were charted across the map with the introduction of steam-power, and these were determined by the cargo availability of commercial significance and the location of coaling stations along the sea lanes. The introduction of oil-burning ships have had its impact on the reorientation of sea routes and sea trade. The osmotic pressure on the living space of the regions which went through the industrial revolution and the increasing demand for a large variety of raw materials to feed the modern machines led to a great spurt in the growth of sea trade. The creation of overseas markets in the industrially undeveloped areas for the mass production commodities of the manufacturing regions led to the increase in density of sea traffic.

THE NEED FOR NAVAL POWER

It is commonplace to observe that with the rising economic significance of sea traffic the protection of shipping and shipping lanes became vitally important and thus arose the need for naval power. But a close examination of the growth and decline of naval power would disclose that it was the race for the exploitation of raw-material-producing regions and potential markets leading to economic and political imperialism which necessitated the growth of naval power. A nation with a seaboard location has shipping lanes either along the coast to carry the domestic trade, or across the high seas to meet the requirements of its overseas trade. The importance of the coastal domestic trade depends on the geographic realities of coastal configuration, the currents and tides, and the oceanic weather of the coastal areas. Countries with long coastal frontiers may not have a significant coastal trade on account of absence of harbouring facilities or unfavourable tidal conditions or stormy seas. The significance of the overseas maritime trade of a nation is based on economic realities backed up by political ambitions and protected by military adventurism. The foundations were laid by despotic monarchies sending out adventurers in search of precious metals across the seas to meet the cost of wars and these metals were unobtainable in Europe. "Missionary zeal, one needs hardly say, was a significant factor in the early explorations and later in colonization."*

The hunger for raw materials—metals, fibres, rubber, spices, beverages and other agricultural and forest products—led to expansion of maritime trade, its infra-structure. The profits earned by trading nations attracted competitors in the field and the need arose for the political demarcation of overseas territories for undisturbed exploitation which finally gave rise to

*_Imperialism and world politics_ by P.T. Moon.

colonialism. For the protection of sea lanes, overseas port facilities and colonial territories a section of the national merchant marine had to be converted into naval auxiliaries. But as Turgot's famous saying goes, "Colonies are like fruits which cling to the tree only till they ripen", and the colonial territories of European powers broke away from the mother country, like the United States of America. The industrial revolution and the technological revolutions in the means of communications and circulatory systems ushered in imperialism. Mercantilism and Colbertism gave way to a period of laissez-faire till the arrival of imperialism. Nations with large merchant navies and naval forces acquired the strategic mobility which assured them the facility of moving their fire-power to critical points. The urge for empire-building rested on the economic need of ensuring the security of territories for exploitation —the extraction of its raw materials, its exploitation as a dumping ground for the marketable surplus, an area for investment of surplus capital. In the second place, it rested on the political ambition of imperial states in denying competitors in the same field the access to exploitable territories and the glorification of the national image in world politics. Without the strategic mobility provided by sea-power in the economic, political and military spheres, imperialism could not have flourished. During this period of history the defence of the mother country did not lie in the defence of its national frontiers but it rested on the protection of the shipping lanes and its far-flung imperial domain. In other words, the naval power of imperial states was designed to defend the extended political, economic and strategic frontiers of a state across the seven seas. In this context Mahan's statement that "the necessity of a navy, in the restricted sense of the word, springs, therefore, from the existence of a peaceful shipping, and disappears with it, except in the case of a nation which has aggressive tendencies, and keeps up a navy merely as a branch of the military establishment", requires reassessment. It could very well be stated that the necessity of a navy springs from its ability to offer strategic mobility to the deployment of fire-power for the protection of the political, economic and military interests of a nation. Or in other words, the Navy is required for the protection of the flag of the nation.

BALANCE OF POWER

The role of the navy as defined above was in conformity with the political doctrine of "Balance of Power" in the power-political arena. Ernst B. Hass has ably discussed the philological, semantic and theoretical confusion attached to the meaning and application of the concept of "balance of power" in an article in 'World Politics,' V. No. 4 (1953). In the present context the term is used to imply the politico-military policy pursued by states to discourage competitors in the power-political race from embarking on aggressive designs aimed at pushing the imperial frontiers that might lead to the upsetting of the 'balance of power'. In this game of securing a favourable

'balance of power' only nations with a powerful navy were prominent participants. When Germany acquired a matching naval strength, she demanded her share of the imperial *lebensraum* from the other imperial powers. Japan embarked on her empire building hunt after her navy gave her the control of the Pacific waters on the Asian margins.

BALANCE OF TERROR

At the end of the Second World War, the United States emerged as a global power with nuclear weapons of mass destruction and a highly efficient delivery system. The concept of 'balance of power' in *realpolitik* was now replaced by a new concept, 'the balance of terror', enunciated by Winston Churchill in his address to the House of Commons on March 1, 1955. In the post war bi-polar division of the world, intellectually and geographically, between the communist block led by the Soviet Union, and the so-called free-world led by the United States, the lead acquired by the United States in nuclear weapon technology endowed it with a favourable balance of terror in respect of the Soviet Union. The nations of the world which did not possess the nuclear capability, either for economic or technological reasons, joined regional defence pacts, like the NATO or the Warsaw Pact. This 'balance of terror' ushered in a new phase of imperialism or colonialism in a different garb, wherein the member nations of regional defence pacts had to surrender their sovereignty in the field of political, economic and defence policies, in varying degrees to the bi-polar power elites. The basis of naval power underwent a radical change in this phase of our history. Naval strategy, ship design, weaponry and tactics of an individual nation had to conform to the overall naval policy of the power-elite. Even the control over the deployment and launching of nuclear forces rested with the power-elite. The member nations of the regional defence pacts had to provide the logistic facilities to the strategic mobiliy of the nuclear and conventional land, air and naval forces. Naval and air power acquired tremendous offensive potential on account of their superior mobility over land forces in the context of a nuclear warfare. But this mobility of naval power depended very heavily on logistic support from strategically located bases. The American attempt at denying this mobility to Soviet forces by following a policy of 'containment of communism' on the political, economic and defence planes initiated Soviet attempts at outflanking in strategically vulnerable areas. The role of the Soviet Union in the political, economic and military build-up of Cuba guarding the strategic focal point of Panama Canal, of Egypt guarding the focal point of Suez Canal, of Indonesia guarding the focal point of Malacca Strait, are only a few examples to illustrate the point. In all these outflanking movements the Soviet naval power plays the major role. Naval power of a nation in this phase of our history is not based on the necessity of defending the coastal frontiers, or protecting the commercial interests across the oceans, but for providing the strong arm backing to its national policies in the international sphere.

'BALANCE OF DISCRETION'

We are at the threshold of a new epoch when the 'balance of terror' is giving way to what I would like to name the 'balance of discretion'. The progress achieved by the Soviet Union in the field of nuclear weapon technology has led to the substitution of 'deterrence' by 'discretion'. The bi-polar power-elites have realised the futility of the use of nuclear weapons for the achievement of any objective in the field of *realpolitik*. In consequence, the member-states of the bi-polar defence pacts have started projecting their national viewpoint in the field of political, economic and defence policies. Some of them are also asserting their rights to develop their national nuclear force in order to strengthen their role within the power blocks. The Soviet and the American attempts at halting the strategic mobility of each others striking forces by denying naval and air bases, through the initiation of political, economic and military subversion and through the activation of nationalism seem to be having a profound impact on the basis of naval power. The changes that are taking place in the global division of power blocks remind one of Turgot's famous sayings: "Colonies are like fruits which cling to the tree only till they ripen". Economic and technological factors impose certain restrictions on the proliferation of nuclear weapon technology. One can visualise the replacement of bi-polar power blocks by poly-centric power blocks. This is bound to usher in a change in the basis of naval power. The geographical distribution of the emerging poly-centric nuclear power blocks, their eco-political interests and their geo-political evaluation of the spheres of influence would be the determining factors for the basis of naval power.

BASIC ELEMENTS OF SEA POWER

The basic elements of sea power are : (a) the physical realities of the geographic environment of the seaboard of a state; (b) the economic realities of the spatial realities of a state; (c) the political realities facing a state in its international relations; and (d) the technological elements of naval power of a specific stage in naval history. All these elements are mutually responsive and subject to revolutionary and evolutionary changes as far as their military evaluation is concerned. The military evaluation of a coastal area which could not be visited by sailing vessels due to unfavourable winds, tides and currents changed completely with the introduction of steam-power. The replacement of wooden ships by iron-hulled ones changed the economic basis of sea power. The Soviet Union which inherited the traditions of a continental power had to pursue a policy of building its naval power in response to the political reality of the 'policy of containment of communism' followed by the United States and its allies. The revolutionary technological change brought about by the introduction of nuclear-powered submarines equipped with missiles that can be launched while submerged has affected the military evaluation of the basis of sea-power in a large measure.

THE PHYSICAL REALITIES

The physical realities of the geographic environment of a state's seaboard conditioning the growth of its naval power :—

(a) A nation with a seaboard can be defended adequately only by its navy, including its surface, underwater and air arms. The longer the coastal seaboard the greater the need for a naval-power to defend it. The defence of the coastal areas by the navy has become more acute since the advances made in military technology in assisting 'combined ops'. It was the overwhelming superiority of the Allied naval power that made the success of the Normandy landings possible. And it was the British navy that prevented the German plan of invasion from materialising.

(b) The hydrographic character of the coastal waters of a state sets functional limitations on naval defence. Low draught surface ships and midget submarines have been designed to increase the functional efficiency of the navy in shallow coastal areas, whether for defence or for offensive action. A proper military evaluation of the hydrographic character of the coastal area of a nation should indicate the types of ships to be designed, ship designs influence the formulation of naval tactics, and tactical requirements lead to the design of armaments.

(c) The character of oceanic weather along the coast affects the choice of site for the development of naval bases.

(d) Naval operational facilities like ports, harbours and shipyards, can only be available where the geographical character of the coast permits the building of such facilities. If such facilities are few in number, there would be concentration of naval effort inviting vulnerability to enemy action. The increasing sophistication of naval technology has enhanced the dependence of naval units on well-equipped servicing facilities. The air power and missile technology have increased the danger to naval bases.

(e) The character of tides and currents along the coast affects the operational efficiency of naval units. An unfavourable tidal condition may prevent a naval unit from getting out to the open sea to meet an enemy force.

(f) Accessibility of naval bases to open seas affects the operational efficiency of naval units. Enclosed seas like the Baltic and the Black Sea, the frozen arctic frontier and the partially closed bases in the Far East, have posed politico-military problems to the Soviet Union in maintaining an effective naval power. The Murmansk frontier being free from icing, the access to this area had to be assured through a politico-military solution at the end of the Russo-Finnish War. The acquisition of the naval bases on the Prussian coast and the coastal areas of Lithuania, Latvia and Esthonia also followed a politico-military action in the region. In spite of the technological advances in the field of building powerful ice-

breakers, the latest ones being atomic-powered, the Arctic coastal area has limited operational value. The acquisition of the Sakhalin Islands also was aimed at securing open access to the Pacific from the naval base of Petropavlovsk. Countries like U.S.A. and France have to maintain a two-ocean navy in view of the danger of the closure of access from one coast to the other to the naval forces during a conflict.

(g) The spatial character of a state determines in a large measure the degree of dependence on naval power for its security. More than three thousand islands constitute the state of Indonesia. It has to base its internal security on naval power. To meet the threat from external aggression the naval power will be the linch-pin of the nation's strategy. Island nations like the British and the Japanese have built their security and prosperity on the doctrine: 'the sea is our life' (Admiral Jellicoe). In this context it is well to remember that "The *sea* is our life; not, be it noted, the Royal Navy, but the *sea*. We, in Great Britain, are dependent for our existence on the safety of the highways of the ocean along which our merchant vessels ply their trade, and it is only by adequate protection of these highways by the Royal Navy that these merchant ships can always be on the move. The Navy is assisted in this task by the Army, which defends the bases, and both Navy and Army are assisted by that essential modern weapon of the air."* The same degree of dependence on the sea and naval power does not characterise a nation with a sea frontier and a continental location, In times of emergency when the navy is unable to protect the sea lanes or the sea frontier, the backdoor opening offered by the continental location can sustain the nation's economic and security needs. This explains the concentration of China's effort on building the biggest Army in the world and its relative neglect of building its naval strength.

(h) Admiral Mahan in his classic book 'The Influence of Sea-Power upon History' has outlined the elements of sea-power: "The principal conditions affecting the sea-power of nations may be enumerated as follows: I. Geographic position. II. Physical Conformation, including, as connected therewith, natural productions and climate. III. Extent of territory. IV. Number of Population. V. Character of the People. VI. Character of the Government, including therein the national institutions." The evaluation of these elements of sea-power should be made in the context of the naval technology of Mahan's days. However, some of the principles enunciated by him have great significance even today. His statement that the geographical position of a country without a continental frontier leads to a concentration of effort in building its sea-power still holds good, except in the case of bipolar power elites who have realised the unequalled strategic mobility offered by the sea-power with its subsurface, surface and air arms integrated—as a single fighting force. China cannot enter the global power political arena in an effective manner as long as she lacks the sea-power. With the largest land

* 'Naval Bases and the Geographical Factor in Sea Power' by Vice-Admiral J.E.T. Harper in *Evolution of Sea Power*.

force in the world, China can only be of nuisance value in global *realpolitik* by creating border tensions and political subversions in the neighbouring countries and thereby disturb the peace of the world. Mahan's thesis that the geographical position of a state may either promote concentration or dispersal of naval forces still holds good. But his contention that geographical position offers central location for mounting offensive action and favours concentration of forces, requires reassessment in the light of employment of air power, submarines, missiles and the modern electronic detection system. Today concentration of destructive fire can be achieved without concentrating the naval forces. In fact, it would be suicidal to bring about the concentration of naval units. Mahan's idea that geographical position offers advantage of mounting 'guerre de course' held the field till the arrival of nuclear-powered submarines with the capability of launching missiles while submerged' Carrier-based aircrafts can also launch air-to-ground missiles at the target from fairly long distance. Communications satellite can detect the movement of enemy shipping and fleet units to guide the missile-launching submarines, surface crafts and aircrafts. The close location of naval bases to the coastline of the enemy which offered opportunities for organising 'guerre de course' in the past will invite destruction of the infra-structure of the offensive sea-power from the air. Mahan's thesis that geographical position in respect of busy sea lanes and control of strategic points and seas has a great impact on the search for strategic naval bases, and attempts at the denial of such facilities to the potential enemy prove the validity of his principle. The physical conformation of the coast and the geographical extent of the coastline in proportion to the living space of the state affecting sea-power have been ably enunciated by Mahan. But his emphasis on the influence of the economic base of a nation on its sea-power needs reassessment in the light of technological advances in naval warfare in recent years. Mahan has laid stress on the ratio of seafaring people to the total population of a state, the adventurous spirit of the people in carrying the flag of the nation beyond the seas for commercial profits and for eco-political exploitation of distant lands and peoples, and also the character of government in fostering sea-power in the pursuit of empire-building, in the context of elements of sea-power. These philosophical observations can be read against the background of the history of the period, but they cannot be accepted as scientific doctrines.

(i) The salinity and temperature gradients of oceanic waters and the influence of oceanic weather in bringing about changes in these conditions have a profound impact on the operational efficiency of modern naval units. Owing to the low electrical resistance the sea-water does not permit long distance communications or detection by means of electro-magnetic radiation. In spite of molecular and viscuviscuous absorption acoustic detection is the most important device employed in submarine and anti-submarine warfare. The properties of sea-water which allow mechanical energy to be converted into acoustic energy, transmitted with small loss, and reconverted into mechanical energy, are responsible

not only for effectiveness of sonar but also for lethality of mines, torpedoes and depth charges. Both the active and passive modes of sonar operation are subject to refraction of sound waves due to changes in the density of sea-water at varying depths caused by temperature, salinity and weather. Thus a knowledge of oceanography assumes great significance in naval warfare today.

THE ECONOMIC REALITIES

The economic realities of the geographic environment of a state conditioning the growth of its naval power are:—

(a) A state must be endowed with the basic resources to sustain its naval power. Before the introduction of the iron-hulled ships Britain had to conserve its oak forests for her shipbuilding industry. The steel clad ships of today depend on the availability of a large variety of mineral resources, cooking coal and power resources. Dependence on imported raw materials for the shipbuilding industry or on imported supplies of ships and its major components cannot constitute a sound foundation for a naval force. Such a dependence enforces limited sovereignty in the exercise of politico-military policies on the receiving state.

(b) The industrial base and the technological level of a country must be able to sustain a modern and sophisticated shipbuilding industry. There are many underdeveloped countries of the world which are gifted by nature with basic resources required for a shipbuilding industry but they lack the industrial base and the technical know-how, particularly in view of the immense progress made in naval technology and its infra-structure.

(c) The ability of a country to divert a large portion of its Gross National Product (GNP) to maintain a naval force adequate for its defence is another reality which a country has to face. The sophistication in the field of naval technology has raised the cost of maintenance of a level where even the relatively prosperous countries are finding it difficult to maintain a modernised naval force. There is also the question of competitive cost of employing different weapon technologies to attain the strategic objectives. The supporters of a naval force have to meet the computer's challenge in arriving at a decision over the acceptance of a weapon system for a nation's strategic objectives. Lord Fisher wrote : "Strategy should govern the types of ships to be designed, ship design as dictated by strategy should govern tactics. Tactics should govern details of armament". But there is a tendency today to work out different weapons systems for the attainment of the same strategic objective and find out the competitive cost of each system with the help of the computers. This may lead to a complete elimination of the conventional concept of the navy commanding the vital oceanic areas and sea lanes by denying its use to the enemy and seeking out the opponent's naval units to destroy them at a time and place of its own choosing. The current American thinking on dependence on

computers and operations research to meet strategic objectives has led to increasing sophistication of weapon technology characterised by unmanned and remote controlled destructive devices. But the success of such a weapons system pitted against the conventional mobile naval forces has yet to be tested. The superior American weapons system has failed to eliminate the Viet Cong forces.

(d) The location of naval bases in relation to the main economic bases of the country and the arteries of its circulatory system has a great bearing on the functional efficiency of naval power. The Soviet naval base at Petropavlovsk is far away from the main industrial bases of the country and the circulatory system linking up the base with the centres of gravity of demographic and economic core areas is laid out over uninhabited and difficult terrain. A large fleet cannot operate from such a base in time of war. The infrastructure of a modern naval base must be backed up by a well-developed industrial and circulatory system.

(e) The maritime economy of a country plays a significant role in determining the scope and strength of a naval power. "Naval power is usually in ratio to the mercantile strength of a nation. When the trading ships of a nation are numerous and are engaged in trading to the ports of the world, the naval power will also be great."* The size of the merchant navy in a sense reflects the economic vitality of a nation. The functional efficiency and the size of the merchant navy of a country forms the economic base of a naval power; it provides trained personnel for the expansion of naval power in time of emergency and provides the justification for the quality and quantum of naval strength.

(f) The availability of fuel in adequate quantities and its guaranteed supply in times of war affect the functioning of a naval power in a serious manner. From the days when the mobility of naval units depended on the vagaries of weather and the muscle power of slave-labour to the coal-burning ships there came a great change. The old freedom of sailing vessels was lost. The 'carboniferous capitalism' of the new era led to the upsurge of sea-power of nations having large reserves of coal and it also led to a race for the colonial domination of areas having rich deposits of coal. Innumerable coaling stations sprang up *en route* sea lanes and a large number of them were converted into naval bases for the protection of the mercantile traffic and the colonial territories. The change-over from coal-burning to oil-burning ships brought about a change of the basis of naval power and led to a scramble for the domination of oil reserves of the world. Today we are entering a new phase when the use of nuclear power is becoming a reality. The dissemination of nuclear technology is likely to bring about a revolutionary change of the basis of naval-power.Coal and oil burning ships have a limited range of operations and they need the support of logistic bases more urgently than the old sailing vessels. At the present moment the Soviet and Chinese governments are using vigorous diplomatic

* Commander Gerald Norman Jones: The Merchant Navy and Sea Power in *Evolution of Sea Power.*

moves, political aid, economic assistance, military aid and subversion to activate the newly emergent nations to deny such bases to the anti-communist powers. The American and British naval powers are in the process of working out a scheme for the setting up of defence of logistic bases jointly. The modern task forces are also composed of a large number of logistic ships to give the battle fleet operational mobility. But the supply of fuel and the control over the producing areas and supply lines still have a profound impact on naval power. The nuclear-powered ships may ultimately change the picture.

THE POLITICAL REALITIES

The political realities facing a state in its international relations constitute the third element of the basis of sea-power. The political elite of a state works out the role that is assigned to it in the power-political arena. Thus politics provides the *raison d'etre* for the formulation of its national military doctrine. The size and role of the naval arm of a state's military power is consequential to (a) the national policies and postures in the international power-political sphere as projected in the formulation of the state's military doctrine; and (b) the overall military strategy in the global and vicinal spheres. Since the Second World War the development of nuclear military technology and inter-continental manned and unmanned missiles with conventional and nuclear warheads led to the emergency of bipolar power-elites in the Unites States and the Soviet Union. For a number of years they dominated the political, economic and military spheres in such a manner that states lacking the potential of building an independent nuclear military technology and its effective delivery system were stampeded into joining regional bipolar power blocks. During this phase of history a member-state of a bipolar power block had to fit in its power-political policies, its military doctrine and strategy to the global policies of the leaders of the power-blocks. The Soviet Union did not go in for a large surface naval power on account of the limitations set by geographical factors of her location. She built the largest submarine fleet and a powerful missile technology. The submarine fleet, especially the nuclear-powered ones, offers the Soviet Union the strategic mobility for launching offensive operations aginast the United States and also the ability to shadow the movement of US naval forces in their strategic deployment. The United States, on the other hand, having a different geographic setting, went in for encircling the Soviet Union by deploying her naval forces, including the air, surface and sub-surface elements, to attain the highest strategic mobility for offensive operations. Both the power-blocks set up a crush-zone composed of member states of military alliances. The Soviet Union failed to attain warm water naval bases offering open entry to the ocean for her naval forces along her crush-zone. China could have made it possible for the Soviet Union to make use of her coastal areas for the Soviet naval forces. But the rapidly widening cleavage between the Soviet Union and China took away the prospect of the strategic advantage

of the geographical position of China for Soviet naval forces in the context of the bipolar power-political struggle. The USA on the other hand built up her crush-zone facing the Soviet Union with a continuous sea frontier along the Atlantic, Mediterranean, the Indian Ocean and the Pacific. The permanent deployment of American naval task forces along the oceanic frontier, made possible by the availability of naval bases and other logistic support by the member -states of the military alliances, constitutes a source of strategic advantage. Moreover, the countries constituting this crush-zone having a seaboard location have their own naval power potential which strengthen the overall naval offensive and defensive capacity of the American power block. Thus during this phase of history the national policies and postures of individual states in the international power-political sphere had to fit in with the global strategy of the bipolar power elites. Even in the sphere of vicinal international relations states were unable to project their political attitudes beyond a certain limit.

With the ushering in of the new doctrine of 'Balance of discretion' and consequential trend towards the emergence of polycentric nuclear power development and the spread of missile techonolgy, individual states have started asserting their right to project their national policies in the global and vicinal spheres. This change is bound to affect the role of naval power in fulfilling the military task set by the exigencies of power political relations of individual states. The 'uncommitted' nations of the world either follow a path of 'active neutrility' or 'passive neutrality' in the power-political area. Active neutrality implies the exercise of freedom to judge and issue on its own merits instead of following the directive of a power elite of a military and political alliance. Passive neutrality on the other hand implies the decision to keep away from international power-political arena as long as the issue does not affect the state directly. The size and role of the naval arm of a state will depend, besides other factors, on the choice of its political policies, whether of active or passive neutrality. India under the leadership of Pandit Nehru and the Arab world under the leadership of President Nasser worked hard for a number of years to extend the area of 'non-alignment' to halt the expansion of the regional defence pacts which were primarily responsible for the spread of 'cold war' between the bipolar power elites. But the non-aligned nations following a policy of active neutrality have to build up their economic and military strength to keep the cold war out of their own territorial sphere. It is the newly emergent independent states in the erstwhile colonial areas that are finding it hard to keep their posture of active neutrality on accont of their economic back-wardness and military weakness. They are also subjected to pressures on two fronts: (a) offer of economic, political and military aid from power blocks, and (b) economic, political and military subversion. In due course continuing instability of the economic, political and military fronts in the face of winning over subversive pressures from the power blocks leads to

the emergence of (a) intra-state wars betwen local power elites representing the spearheads of power-blocks interests, or (b) limited wars between neighbours which is actually inter-power block war by proxy. All these political issues, facing a state in working out its international and vicinal political postures, influence the role of naval power.

At the end of the Second World War the liquidation of the British, Freanch, Dutch and Italian imperial powers in the countries encompassing the Indian Ocean created a power vacuum in this region. All these imperial powers depended very largely on their naval strategic mobility to ensure control over their overseas territories. In view of the economic backwardness, relative political instability and military weakness of the newly emergent independent states, the power vacuum in the Indian Ocean constitutes a grave threat to the security of the region. The Soviet Union, the Western Powers and China are overtly and covertly battling to fill this power vacuum. There is a serious move to establish a naval base in the Indian Ocean jointly by the United States and United Kingdom. The Soviet Union is trying to outflank the western powers by building up the naval strength of the UAR and Indonesia. China has been forced to limit her activities to economic and political subversion in the absence of a naval power to give her armed forces strategic mobility. India is ideally located in the Indian Ocean, with an economic potential and politically stable democratic system to be able to fill the power vacuum in the Indian Ocean region, if she concentrates her efforts in building a modern naval force. In fact, the geo-political realties of the region demand such an active and purposeful effort aimed at the neutralisation of the extension of power-political struggle of the bipolar power elites in this region.

THE TECHNOLOGICAL ELEMENTS

The technological elements of sea-power in the context of a specific stage in naval history have a profound effect on the military evaluation of the geographic realities. The advancing naval technology not only affects the tactics and strategy of naval warfare, but also affects the capacity of a nation to deploy its naval power in pursuance of its political policy. The major naval technological revolutions are (a) the iron-hulled ships replacing the wooden ones; (b) the introduction of steam-powered and later the oil-burning internal cobmbustion engines to replace the sailing vessels; (c) the development of heavy ordnance and armour; (d) the submarine methods of warfare with torpedo firing sub-surface vessels for offensive warfare and with minefields for defensive purposes; (e) the naval aircraft, both shore-based and carrier-based, for offensive as well as defensive roles; (f) the nuclear-powered and missile-launching surface and sub-surface vessels; (g) the radar and electronic devices as aids to tactical operations.

The introduction of iron-hulled ships implied a dependence on an industrial base which could meet the requirements of shipbuilding and its engineering infra-structure. It also brought about a military re-evaluation of a nation's capacity to play its role as a naval power depending on the availability of mineral and power resources required to sustain the shipbuilding industry. The industrial revolution which overtook Europe and America was confined to those countries who had the nature's gifts to build the coal and iron complex which were the basic pivots round which all other functions of the new society evolved. Nations devoid of these resources lost their maritime strength.

The adoption of the steam-engine and later on the oil-burning internal combustion engine and the nuclear-powered propulsion system, have changed the strategic evaluation of geographic realities in determining the potentialities of a nation as a sea-power. In spite of certain tactical advantages which these technological revolutions brought to naval power, like speed, manoeuvrability and haulage power, they made naval power dependent on bases and limited their range of operations, until the introduction of nuclear power, which is still in an experimental stage. "Mobility is the linch-pin of the nation's strategy. True naval mobility to remain at sea for weeks or months, or even years, is something we have lost in the age of steam and the internal combustion engine". In spite of the large variety of logistic ships which keep the battle fleet at action stations, the dependence on bases and the security of fuel supplies have imposed the necessity of exercising military, economic and political control over bases and fuel sources.

The developments in armour and ordnance led to a change in the military evaluation of the geographic realities of states and their potentialities in the field of sea-power. In the first place, the economic and technological resources of a state to meet the requirements of providing the battle fleet with heavy armour and ordnance have to be evaluated. Secondly, the consequential damage to ships due to the use of heavy ordnance necessitates the location of repair and replacement bases not very far away from the battle zone. The increasing sophistication of naval ordnance, its guidance system and the electronic gear for detecting the presence of enemy craft in the air, on the surface and below the surface, have made the modern ships more dependent on logistic support for repair and replacements of damaged equipment. Thus naval powers with global commitments, like the United States, have to establish bases at strategic points to give logistic support to their battle fleet.

The vulnerability of surface ships to heavy ordnance and air attack has led to increasing sophistication of submarine warfare. The nuclear-powered submarines with their unlimited range and their ability to fire gui-

* *The Mobility of the Fleet* by Capt. L.E.S.H. Le Bailly, R.N.

ded missiles while submerged have made them the most important offensive weapon of naval power. This has activated research and development in anti-submarine warfare on a big scale. It is true that the submarines suffer from limitations, like lack of speed and low cruising radius, except in the case of nuclear-powered ones, vulnerability to gunfire and under water attack, poor vision, limitations of operational depth and their liability to detection. These limitations have necessitated the integration of the submarine arm of sea-power with the naval, air and surface crafts from effective combat employment. The nuclear submarine with missile system is more like a strategic air arm and can operate independently for the attainment of strategic objectives. But these technological revolutions have made it necessary to review the military evaluation of geographic realities of a state in determining its role as a naval power. A country like Indonesia with more than 3000 islands within its territorial limits needs an effective naval power to ensure internal security as well as to defend its political interests through military action. But the technological level and the economic realities of the country in the context of modern naval technology do not point to its ability to fulfil its role as a sea-power. Indonesias' naval force is constituted of units obtained from Soviet, American, British, Dutch and other sources. During an emergency the political interests of Indonesia and the countries which have supplied the naval units may clash and the supply of spare parts may be stopped. This would paralyse the naval arm of Indonesia's defence forces at a critical point.

FORWARD STRATEGY

The technological progress in the field of electronic warfare, the modern task force with aircraft carriers as nucleus of the offensive naval force, the anti-submarine forces, have increased the dependence of sea-power on forward bases. The acquisition of forward bases has political implications. With the modern techniques of political subversion, the flame of nationalism can be set ablaze in the oversea naval bases by the enemy so as to make these bases operationally ineffective. But the strategic concept of modern naval warfare demands the prevention of the offensive naval power of a nation from breaking out into the open seas. This involves the mounting of guard on enemy naval bases, initiation of electronic warfare on the naval communication system of the enemy, harassing the enemy's supply lines with submarine and anti-submarine operations. and finally engaging the naval forces of the enemy in battle at a time and place of its own choosing. This concept of "forward strategy" has replaced the old strategic concepts of (a) the command of the seas, which is both a strategic and tactical concept, and implies the elimination of hostile interference by establishing complete domination of the operational area by all units of the naval arm, restricted to time and space. This domination of geographical space over the oceanic frontier is no longer possible in the context of modern naval techno-

logy, particularly since the introduction of the naval offensive capacity in the submarine and air-space of naval operational theatres. (b) The control of the seas, which implies the ability to keep watch over the movement of hostile naval craft to prevent their employment in hostile action, is primarily a defensive doctrine for the protection of the maritime frontiers of a nation. Modern naval technology has also made the control of the seas, in time and space, relatively ineffective. (c) The freedom of the seas, which is a well-known concept demanding the freedom of movement along the sea lanes of naval craft of any nation, implies retaliatory action in case any nation attempts to restrict the freedom of movement. The convoy system adopted to protect the shipping lanes from hostile inteference will have a very limited success in the face of the naval air arm and submarine warfare. The adoption of forward strategy in naval warefare requires the military evaluation of the geographic realities of both the adversaries.

CORRESPONDENCE COURSE

ENTRANCE EXAMINATION FOR THE DEFENCE SERVICES STAFF COLLEGE MARCH 69

United Service Institution will be running a correspondence course commencing from 1 Aug 68, for its members, for the Entrance Examination for the Defence Services Staff College, scheduled to the held in Mar 69.

2 The Correspondence Course will cover the following subjects:

(a) Tactics 'A'
(b) Tactics 'B'
(c) Administration and Morale
(d) Military History
(e) Current Affairs
(f) Military Law

3 Tuition fees for this course are—

(a) Rs. 250/- for the entire course
(b) Rs. 50/- for one subject

4 Members desirous of joining the correspondence course may apply to the Secretary, United Service Institution as soon as possible but not later than 15 Jul 68, giving their particulars and cheques for the tuition fee. Cheques should be made in favour of Secretary, United Service Institution of India, King George's Avenue, Kashmir House, New Delhi-11

5 Non member officers may also join the course, by becoming mebers for which they will be required to pay an additional Rs. 20/- ie Rs. 10/- as entrance fee and Rs. 10/- as a year's subscription.

MAINTAINABILITY OF SERVICE EQUIPMENT

COLONEL S. S. APTE, BE (MECH) MASQC, PTSC

Equipment for the Services is required to be robust and reliable enough to operate under conditions of severr weather, terrain and mentally stressed crew. Use of high grade materials, generous dimensions, improved processes, strict quality control and, above all, a fundamentally sound design result in equipment having a low failure rate.

RELIABILITY VERSUS MAINTAINABILITY

However, there will always be failures no matter how well designed and operated the equipment is. The cost of designing and manufacturing an equipment which almost never fails, is fantastic —the space vehicle is a case in point. No country can afford the cost of total reliability for every equipment used in warfare, A trade-off has to be accepted between the consequences of occasional failures of equipment and the cost of having a support service meant to repair the failed equipment promptly. Typically, the communication equipment of World War II was cheap to manufacture as compared with present-day equipment, but it was not as reliable and its support costs were very high. The term 'maintainability' refers to the support aspects of the equipment as much as reliability refers to its failure aspects. This article deals with the subject of maintainability in this sense.

WHILE considering maintainability we must ask the question: "What is the impact of weapon system design and supportability upon the spans of operations and logistics including all of their interrelated and highly dependent functions?" At the centre of all these, is one single factor around which everything revolves—the failure. Its nature and consequences dictate the responsibility required by all the segments of command and support activities. The worth of a failure will depend upon whether it is in a weapon, a vehicle, a tank or a machine-gun; communication equipment or radar. It is also necessary to evolve the technical nature of the failure. The former will assist in allotment of priorities (by way of employed costs) and the latter will give the technological solutions, i.e. repair or replacement.

The reliability of an equipment can be measured in terms of its failure rate. Maintainability is best measured in terms of the down-time of the equipment. In order to improve maintainability, it is necessary to have data on the pattern of down-time in relation to the environments. The down-time, i.e. the period of non-availability to the user due to maintenance or repair of the equipment, consists of the following elements:

Repair Time

Inspection, test and diagnosis time.

Active repair time which consists of stripping, removal, replacement and adjustment.

Final test time.

Logistic Time

Awaiting appropriate tools or test equipment.

Awaiting spares or other materials.

Awaiting proper technical information.

Administrative Time

Awaiting repairs for want of manpower/skills

Awaiting repair due to bad weather.

MAINTAINABILITY ANALYSIS

The maintainability analysis starts with collection of data on existing equipment operating under different terrain and weather conditions in the field. Its down-time is analysed into the above elements. A study carried out by the author shows that a relatively small proportion of faults contributes to the bulk of the active repair time or, for that matter, the total down-time. Such faults are then segregated for study, because any reduction in their occurrence or repair will greatly reduce the total equipment down-time. It is, therefore, unnecessary to study in depth a large number of faults for maintainability analysis.

The analysis will show which elements of the down-time predominate in a particular 'equipment-environment' combination. Typically, it has been found that in electronic equipment the diagnosis time is the most predominant part of the repair time. Comparatively, the actual repair itself takes very little time. When spares are badly scaled or badly provisioned, the logistic time goes up sharply. Similarly, bad weather affects the administrative time and often the active repair time. Thus, the hexagonal spanner can be operated comfortably with bare hands even in some restricted parts of an equipment but in sub-zero weather the same spanner cannot be operated because much of the space is taken up by the heavy gloves worn by the mechanic. The active repair time itself is greatly affected by the accessibility and possibility of adjustments using authorised tools.

After the major elements of down-time are isolated, they should be studied under field conditions and corrective action taken in the manner suggested below.

DIAGNOSIS

Bring out test points, provide inspection plates and holes; provide portable test equipment and instruments for quick fault location. The diagnosis of the cause of the fault is more difficult. Many faults are associated and some faults are the secondary results of other primary faults. A study of these associations should be made and fed back to a central technical service for dissemination of the information and to the training establishments for inclusion in the training of the mechanics who will then be familiar with rapid diagnosis of the majority of the faults in that equipment, and to that extent, the down-time will be reduced. For newly introduced equipments, the results of extensive field testing, accelerated life testing could be utilised.

ACCESSIBILITY

As the user demands more and more performance out of military equipment along with greater compactness, accessibility becomes difficult. If at the design stage an attempt is made to identify the components which are likely to fail rather frequently and such components made accessible for removal and replacement, a great deal of repair time will be saved. Provision of special tools to remove awkward or unusual components is often necessary, but their types should be minimised by use of standard components and standard fasteners. These are requirements of the maintenance and repair agencies and should be reflected to the designers through maintainability qualitative requirements on the lines similar to General Staff qualitative requirements, in order to force the designer's attention to these problems.

Maintainability engineering has not yet reached the same stage of quantification as reliability engineering. However, even a qualitative assessment and attention to maintainability requirements would go a long way in reducing down-time. An example of accessibility of failure prone components in sophisticated equipment is the use of modules in electronic equipment. The modules are equivalent to mechanical sub-assemblies. In Western countries their production is very cheap and their repair is not considered worth while. When a module fails due to failure of one or more components, the complete module is removed and replaced. (In our country, perhaps a different approach may be necessary, keeping in view total support costs).

SPARES

The position of spares at a particular echelon of repair is closely interlinked with the type of repair permissible at that echelon of repair. Whereas fast-moving spares usually do not present much difficulty in assessment,

the slow-moving spares, which are usually also expensive, behave in the most apparently erratic manner. A sensible provisioning system which ensures reasonable availability of critical spares would ensure that the down-time of the equipment on this account is of a low order. If the maintainability analysis indicates spares as a cause of excessive down-time, this should raise questions on the accuracy of the authorised scales or the lapses in their procurement so that corrective action can be taken.

SPECIAL TOOLS

Special tools are in a slightly different category, These tools are usually not frequently used and the temptation to discard them is great. However, if the assessment of the failure prone components is made accurately, there should be no apprehensions about the repair workshops carrying an 'unnecesssary' load of these tools. In any case, for many critical items difficult to approach or adjustment by ordinary hand tools, special tools will always be needed.

TECHNICAL KNOW-HOW

Even a well-trained individual cannot be expected to know everything about an equipment. It is not realised how much time can be wasted and how many incorrect and often damaging repairs can result due to non-availability of technical literature in the form of repair manuals, maintenance instructions, illustrated parts list, etc. This applies particularly to imported and newly introduced components. No doubt, a certain amount of improvisation and 'feel' is always exercised by a good technician but with the rapid development of technology and sophistication of present-day equipment, it is unfair to expect too much knowledge and competence out of such technicians without giving them the benefit of technical literature, which should always be available with the equipment. The presentation of technical information, particularly for the level of the mechanic, is an art in itself and our present-day manufacturers and a AsHSP would do well to remember this. Badly printed photographs, confusing circuit diagrams, and conflicting instructions must be avoided at all costs.

NON-AVAILABILITY OF MANPOWER

A high contribution to down-time due to non-availability of manpower of the right skills indicates that the yardstick used for the planning of manpower for that particular equipment in the field was incorrect. The corrective action lies in increasing such manpower in the field, improving their training and efficiency, or relegation of certain repairs (which contribute to excessive down-time) to a rearward echelon so that the total repair load in the forward echelons is reduced. This, however, should be

be the last resort as it would also increase to and fro movement of the equipment to the rearward echelon and this in turn would add to down-time.

CONCLUSION

Most users in the Services are now fairly familiar with the term 'reliability'. It is not often realised that the capital cost of highly reliable equipment can be so high as to be out of proportion to the benefit of having failure-free equipment. The alternative, therefore, is increasing the maintainability of the equipment, i.e. ensure a quick return to service after failure. In fact, for conventional equipment, greater and greater stress is being laid in the advanced countries, on the maintainability of the equipment and not purely on its reliability. It will be well for us to follow their example in this respect.

DEFENCE SCIENCE NEWSLETTER

By L. K. WADHWA

THE 'balance of terror' between the world's super powers—the U.S. and the U.S.S.R.—based on nuclear deterrence escalated to a new high with the announcements of multiple targetable re-entry vehicles (MTRV), the fractional orbit bombardment system (FOBS), the anti-ballistic missile (ABM) systems and the seaborne anti-ballistic missile intercept system (SABMIS).

Whereas the concept of nuclear deterrence is based on the capacity for assured destruction of a level considered unacceptable to the enemy the ABM and the SABMIS which are active defence systems provide the capacity to limit destruction that the offence could otherwise inflict. The MTRV and the FOBS are sophistications introduced in the delivery system with a view to degrading the ABM defences and for augmenting the assured destruction capability.

MULTIPLE TARGET RE-ENTRY VEHICLE (MTRV)

This system is developed by the Americans. A conventional ICBM is tipped with a single warhead whereas a MTRV carries a cluster of smaller warheads that could be ejected and individually aimed at a number of targets lying in the trajectory of an ICBM. This method of delivery has a number of advantages. First, only one ICBM would be needed for a number of targets which may be separated by large distances. Second, defence against multiple warheads would become more difficult as the defence system could take cognisance of the intrusion at very much shorter distances and times for it to be reasonably effective. Third, the cost effectiveness of a MTRV would be higher than a single equivalent size warhead for the simple reason that a single large-size warhead would overkill a given target whereas a number of smaller warheads (equivalent to a single warhead) would spread out their kill potential over a number of targets reducing or eliminating the possibility of an overkill.

FRACTIONAL ORBIT BOMBARDMENT SYSTEM (FOBS)

This system is developed by the Russians and is reported to consist essentially of three clearly indentifiable pieces—a payload, a platform and a third stage. The payload makes a re-entry a few hours after launch, the spent and tumbling third stage some few hours after that and the platform some 10-12 hours after entry of the payload. Unlike an ICBM which reaches a peak altitude of 800 miles, the FOBS is fired into a very low

orbit about two miles above the earth. At a given point, generally before the first orbit is complete, a rocket engine is fired which slows down the payload and causes it to drop out of orbit. The payload then follows a re-entry path similar to that of a ballistic missile.

Because of the low altitude of the FOBS orbit, some of their trajectories could escape detection by early warning radars including BMEWS. Also impact point cannot be determined until ignition of the rocket engines that deboost the payload out of the orbit and that may occur roughly three minutes and some 500 miles from the target. The flight path could be as much as 10 minutes shorter than that of an ICBM.

The Russian ICBM SS-9 is believed to be the carrier for the FOBS. The accuracy of an ICBM modified to a FOBS role is considered to be significantly less and the payload of an FOBS which could be a fraction of that in the ICBM. The FOBS would not be accurate enough for a satisfactory attack upon missiles in their silos but might be effective against soft targets such as bomber bases or cities.

An FOBS orbit could be from the south or the north. Some measure of antidote against FOB attack could be provided by an over-the-horizon radar system which could give a 15-minute warning of an FOBS attack.

ANTI-BALLISTIC MISSILE (ABM) SYSTEM

An ICBM tipped with a nuclear warhead is an offensive weapon intended to put in the hands of its possessor a certain amount of destruction capability, whereas an anti-ballistic missile system is an active defensive system intended as an antidote to the offensive ICBMs. It is expected to increase the capability of the defender nation for damage-limitation. The Soviet Union is reported to have deployed an ABM system around Moscow and possibly around Leningrad too. The US has also decided to develop and deploy such a system around the northern rim of the continental United States and about 25 major cities. The US ABM system—the Nike-X — uses the techniques and technology developed during the studies and development of its earlier Nike-Zeus ABM system. The Nike-Zeus was based around the Zeus missile which was intended to destroy the incoming warheads with high energy neutrons generated from the explosion of the Zeus nuclear warhead. This system was meant for an area defence.

The Nike-X—the current system—is based around the Spartan and the Sprint nuclear-tipped missiles and consists of the following:—

The Multifunction Array Radar (MAR)

It is a very powerful phased array radar which can perform all the defence functions involved in engaging a large, sophisticated attack, central

control and battle management, long-range search, acquisition of the target, discrimination of warheads from decoys, precision, tracking of the target and control of the defence interceptor missiles.

The Tactical Mar (TACMAR)

It is a scaled down, slightly less complex and less powerful version of the MAR, and can perform all the basic defence functions in a smaller, less sophisticated attack.

The Perimeter Acquisition Padar (PAR)

It is a phased array radar required for the very long-range search and acquisition functions involved in area defence. To achieve the full potential of the extended range Spartan, the target must be picked up at much greater distances in order to compute its trajectory before the Spartan is fired.

The Missible Site Radar (MSR)

It is a much smaller phased array radar needed to control the Sprint and Spartan interceptor missiles during an engagement. It can also perform the functions of the TACMAR but on a considerably reduced scale. Acutally, a number of different sizes are being studied. This 'modular' approach will permit tailoring the capacity of the radar to particular needs of each defended area.

Spartan Missile

It is a three-stage missile with a nuclear warhead capable of intercepting incoming warheads at relatively long-range (up to 400 miles) above the atmosphere.

Sprint Missile

It is a short-range (20-25 miles), high acceleration interceptor missile designed to make intercepts at lower altitudes. The explosion of the warhead is expected to cause damage to the intruder missile by X-rays and neutron bombardment (in case of Spartan) or by blast and heat (in case of Sprint).

In addition, the missile force would be supplemented with a large number of new high-performance interceptor such as F12 and the airborne warning and control aircraft (AWACS)

SEABORNE ANTI BALLISTIC MISSILE INTERCEPTOR SYSTEM (SABMIS)

This system is under very active consideration of the U.S. Navy. It is the U.S. Navy's equivalent of the Army's Nike-X. Such a system, launched from submarine or surface ships in international waters close to the Russian or Chinese landmass, could provide the opportunity to destroy enemy missiles shortly after launch. It would provide a mobile launch platform which would be difficult to locate, whether under water or on the surface, especially if decoys are used.

The development of the SABMIS to some extent would offset the advantages of highly sophisticated ICBMs now under development with multiple warheads and penetration aids. SABMIS, deployed close in to enemy sites, could cause destruction of the missiles before they were far enough on their trajectories to use their penetration aids or mutltiple warheads.

Another advantage of the SABMIS would be the protection that, could be afforded to friendly nation by deploying the missiles at strategic location in international waters.

The US Navy feels that any system developed for land can be based on ships, either under water or surface and the study is needed to come up with the best combination of submarine and ship platforms to ensure survival against surprise attacks as well as effective interception of enemy's ICBMs.

The operational deployment of the Nike-X and SABMIS would provide 'defence in depth.' With an effective SAMBIS defence the land-based Nike-X would have a smaller number of incoming missiles to defend against.

SHORT RANGE SURFACE-TO-AIR MISSILES

The USA, UK and France have invested a large amount of money and R & D effort in the development of a weapon system for defence against low flying high performance aircraft. Some of the systems that were announced to be operational during 1967 are briefly described here.

The Rapier System

This is developed in UK for the British armed forces. The system is mobile and is designed for defence against low flying aircraft and helicopters. With a speed of more than Mach 2, the Rapier reportedly has a high degree of accuracy and can engage subsonic and supersonic aircraft from near ground level to altitudes of several thousand metres.

In its first firing at a live target, Rapier scored a direct hit; the target aircraft was a Meteor flying at 3,000 ft at a range of about 3,000 yards from the launcher.

The Rapier consists essentially of a missile launcher (carrying four rounds), an automatic target detection and acquisition radar, an optical sighting unit and a small petrol generator set. The radar gives warning of an approaching hostile aircraft, probably in association with an IFR system and indicates approximate range and bearing. To do this with fast, low flying aircraft where limited time is available for detection and acquisition, high scanning and data-processing rates are necessary. The operator seated at the operating unit centres the target in his crosswires, and fires the missile. The launcher is slaved to the sighting unit so that the missile is already aligned approximately along the flight path. An infra-red goniometer is probably used to measure the error angle between the operator's line of sight to the missile and to the target, and this error is processed in the launcher and is fed back to the missile via a radio link.

The Rapier system is mounted on a two-wheeled trailor which carries four launching rails and is towed by a Land Rover.

Roland

This is a fair weather missile system for use against aircraft flying low and with speeds up to Mach 1.3.

The Roland is comparable in size to the Rapier and their systems concept and method of working are broadly similar.

The radar has a search range of about 8n. miles and can engage targets at maximum and minimum ranges of about 3n. miles and 1650 feet.

Chaparral

This missile system was selected recently by the U.S. Army for providing field commanders with low altitude air defence in forward battle areas.

The self-contained Chaparral fire unit is capable of aiming and firing missiles against hostile aircraft while being propelled by M-730 tracked carrier, railroad flat cars or flatbed trucks and trailors. The unit can also be ground emplaced.

It is an IR (infra-red) heat-seeking missile system consisting of a missile launcher and mount and fires air-to-air missiles modified for launching from the ground.

Blow Pipe

Full size model of this simple man-portable weapon system for the defence of forward areas against close-range, low-level air attack was shown publicly for the first time at the SBAC Display in September, 1966. The system is being developed by Short Bros. (UK) and a number of test rounds have been successfully fired. Blowpipe is reported to consist of a canister which contains the missile for transport purposes and is also the launcher and a lightweight radio transmitter carried on the operator's back and used for missile guidance. Handling weight including the canister is only 28 lbs, and the system can be carried by para drops.

A telescopic leg supports most of the weight of the canister at launch and enables a long 'readiness' period to be maintained. The target is acquired and tracked by slewing the canister with the left hand while using the optical sight fixed to the launcher. The solid-fuelled missile is fired from the launch-tube by an explosive charged and controlled by radio command via a thumb-operated control stick operated with the right hand. The warhead weight is about 5 lbs. The range is probably about 5,000 yards.

Besides its role as an anti-aircraft missile, the weapon can clearly be used with effect against light-skinned vehicles, such as personnel carriers. In this role, it could satisfy a reported army requirement for such a weapon and could be operated from light aircraft or helicopters.

Redeye

It is a shoulder-mounted point defence anti-aircraft system. Redeye is a solid-fuelled IR-guided missile which is carried in, and fired from, a glass fibre tube-launcher which is mounted on the operator's shoulder. An important feature is an automatic sight which looks on to the target. On a 'ready' signal given by a red light, the operator pulls a trigger to fire the missile, after which no further action is required on his part.

The complete system weighs 30 lbs. The missile itself weighs 18 lbs. and is 4 feet long. The guidance package has been recently redesigned to incorporate integrated circuitry for reasons of economy.

Some of the other important developments in the field of missilary are the following:

Lance

This is a surface-to-surface, inertially guided missile under advanced-production engineering. It weighs about 3200 lbs and can carry either a nuclear or a HE warhead up to a maximum range of about 45 miles. This missile is intended to replace Honest John free-flight rocket. The missile has passed its torture tests and the complete system was recently

flight-tested at the White Sands Missile Range at New Mexico, USA. A fully fuelled missile and its launch vehicle—a combined weight of more than 10 tons—were dropped from a U.S. Air Force transport, lowered to the desert under six parachutes, and then driven cross-country over improved and unimproved roads.

It can be moved into action by a helicopter, airdropped by parachute, or carried by a vehicle over rough terrain under all weather conditions. The launcher can be towed by even a ¼ ton vehicle. The basic launcher frame and missile fit into a full tracked carrier for land or water surface mobility. It takes a six-man crew to operate each Lance system. It is propelled by a storable, pre-packed liquid propellent system, the first U.S. Army missile so powered.

The U.S. Navy awarded a £ 6 million R & D contract for adapting the Lance to the naval role. This missile called the Landing Force Support Weapon (LFSW), is being designed for shore bombardment. It will have pinpoint accuracy, all weather capabilities, and a range longer than that of the biggest guns currently used by the U.S. Navy. This missile system will support Marine and Army during amphibious landings.

'Martel' Missile

First details of the Martel (Missile Anti-Radar and TV), a new generation air-to-surface precision tactical missile jointly designed, by U.K. and France have been released. Martel is claimed to be the first air-to-surface tactical missile in the Free World which offers a real stand-off capability. This feature gives a new element of surprise in attack, together with a high degree of invulnerability to the launching aircraft.

Designed to function in an ECM environment, Martel is interchangeable, depending on mission requirements. The anti-radar version has an all weather attack capability and can operate against multiple targets. The TV version flies towards the target area automatically with final guidance by the weapon's operator.

France and Germany are jointly developing two new anti-tank missiles (ATM), the Milan and Hot.

MILAN

It is a short-range, tube-launched, guided anti-tank missile. It uses a solid propellent and has a new combined wire-IR guidance system. The missile is stabilised in flight by four hinged tail fins.

The Milan can be fired from the shoulder or from a tripod which ressembles that of the U.S. TOW rocket. The guidance system and the launching tube are one unit.

HOT

It is of larger size optically guided, tube-launched ATM. Basically, the weapon corresponds with the US TOW system, but it offers some improvement. Its guidance system is, in part, similar to that of Milan missile, and like the Milan, it has tail fins which open out as the missile leaves the end of the tube to spin and stabilise it in flight.

The Hot can be mounted on vehicles, including helicopters.

SELECTABLE RANGE ROCKET

The U.S. Army scientists have controlled solid fuel and a liquid oxidizer in a 'selectable range' rocket. The system, employing a propulsion concept holding promise of future missile and space application, has been successfully tested at Redstone Arsenal, Alabama.

The selectable range system has not been used before because of problems in controlling the burning fuel. Conventional rockets normally remain airborne until the solid fuel is completely expended.

A solid propellent first stage is used to boost the new rocket. A second solid fuel and liquid oxidizer stage ignites and keeps the rocket airborne. At a determined time, the oxidizer is shut off, extinguishing the fuel. The rocket impacts to the desired target area.

ANTI-MORTAR MISSILE

The U.S. Army currently in a crash program to develop a radar that can speedily locate enemy mortars firing from any direction, has received an unsolicited proposal from the Marquardt Corp. that goes even further. The proposed system would detect and destroy an incoming mortar shell before it hits.

MILITARY-ELECTRONICS

The year 1967 witnessed quite a few important developments in military electronics. The war in Vietnam provided the impetus for the development of various search and detection devices. Some of the interesting items are described below :—

Multiple-Target Area Radar

An/PPS-5, combat area radar, has been developed under technical direction of the US Army Electronics Command. It is designed to detect and track personnel and vehicles at distances of more than six miles.

The battery-powered, solid state circuit radar displays target information visually and aurally, and is capable of tracking moving targets in azimuth or direction as well as range.

Designed to give greater resolution than that by earlier similar type radars, the AN-PPS-5 has an automatic sector scan capability. All targets in the sector surveyed are visible at one time and can be distinguished by the operator through the audio output or by the radar 'signature' of the display.

UK has also developed a similar type of radar (GS14MKI) with comparable performance and it is expected to go into service very soon.

Personnel Detector—MANPACK

Type E-63, or 'People Sniffer' as it is known in the field, weighs 24 lbs and is a chemico-electronic simulator for the nose. It is designed literally to smell the body odours of concealed troops and has undergone successful field trials in Vietnam.

Developed by the General Electric and the US Army's Limited War Laboratory, the E-63 is based on a phenomenon often demonstrated in the high school chemistry classes:. If open bottles of ammonia and hydrochloric acid are placed close together, a white cloud of ammonium chloride particles forms above them. The particles serve as nuclei for the condensation of the air's water vapour into tiny, foglike droplets.

In Vietnam, the ammonia is produced by groups of perspiring men. Urea, a component of perspiration, is attacked by bacteria on the skin and decomposed into ordourless carbon dioxide and ammonia gas. Thus air in the vicinity of a large group of men—especially in hot and humid climates —contains high concentration of ammonia. To detect the ammonia, the E-63 scoops up air, passes it over a wick saturated with hydrochloric acid and into a humidifying chamber. If the air contains any ammonia, a fog forms, changing the amount of light shining on a photo-electric cell and varying the amount of electric current that it produces. The current variation in turn varies the frequency of a beeping sound in the operator's headphones and produces a higher reading on a meter warning him that there are people nearby. Higher concentration of ammonia, presumably produced by larger body of men, produces denser fog and higher meter reading.

Although it was originally designed to be carried on the back of a footsoldier, the E-63 has been used most effectively abroad a helicopter. Flying above the treetops at speeds as high as 100 mph, helicopters equipped with E-63 have detected groups of men in jungle covered 'free bombing zones' —areas cleared of civilians where anything that moves is regarded as fair game. On the basis of E-63 readings, artillary fire has been called in and flights of B-52S have been dispatched to saturate the suspicious area with bombs.

The device is effective only when operated into the wind carried by the leading man in a patrol, for example, the E-63 will pick up the odour of patrol

members themselves if the wind is at their backs. But it is sensitive enough to pick out an upwind enemy sniper lying in ambush at distances greater than the range of most riflles.

Battlefield Burglar Alarm

The US Army has recently tested a battlefield burglar alarm to warn of the approach of an enemy. An eight-ounce device contains a flash-light battery, buzzer, signal light and a spool of thin wire.

The soldier surrounds his position with nearly invisible wire and puts the alarm nearby or on his belt. If an enemy breaks the wire, the alarm sounds or the light flashes.

Each set has three spools of wire, 9,600 ft. per spool. Breaking with only three and one-half to six ounces of pressure, thewire can be repaired by melting stands together with a match.

Airfield Surveillance Radar

Decca Radar Ltd (UK) is now conducting field trials with ASMI MK3 airfield surveillance radar. The radar display has very sharp defination and high accuracy by virtue of the high picture renewal rate, the rotational speed of the radome installed antenna being 750 r.p.m. The surveillance coverage extends from 2.5 n. miles down to 200 yards. Range discrimination is better than 30 feet and bearing discrimination better than 36 ft. at 1,000 yards range. The equipment can detect small objects, i.e. vehicles at ranges up to 1.5 miles. The display is flicker-free and easy to interpret even in normal control room lighting in day-time.

Electronic Surveillance

An easily camouflaged electronic system that detects the intrusion of people or vehicles has been developed by General Dynamics (USA). The system is named the 'weed'.

The Weed is made up of two units, a transmitter and a receiver (squealer). The remotely located squealer receives any change in signal from the Weed transmitter. An aural or visual signal alerts the operator to the change.

The change in signal informs the operator that a person or vehilcle is approaching the transmitter. Because the squealer is tuned to a particular transmitter, the operator knows at what point the intrusion takes place.

As the man or vehicle moves towards or away from the Weed, the action causes a rising and falling whistle in the squealer. This gives a relative indication of speed.

The system can be used for security or for intelligence. For security coverage a fence of Weeds placed 100 or 200 feet apart could be used to cover a trail, ravine, road, or similar area of restricted movement.

For intelligence use, Weeds spaced about 1/4 mile apart at key locations along a road or trail could be used to determine direction of travel, approximate number of vehicles or men and their speeds.

CORRESPONDENCE COURSES

PROMOTION EXAMINATIONS PART "B" AND "D"

1 United Service Institution Correspondence Courses for promotion examinations parts 'B' and 'D' to be held in Oct and Nov 68 will commence from 15 May and 15 June respectively.

2 Correspondence Courses will cover the following subjects:

(a) **Part "B"**
- (i) Tactics
- (ii) Administration and Military Law
- (iii) Current Affairs, Military Geography and Economics

(b) **Part "D"**
- (i) Tactics
- (ii) Administration & Morale
- (iii) Military History
- (iv) Current Affairs, Military Georgraphy and Economics
- (v) Military Law

3 **Tution Fees**

(a) **Part "B"**
Rs. 80.00 for the entire course
Rs. 30.00 for one subject

(b) **Part "D"**
Rs. 160.00 for the entire course
Rs. 40.00 for one subject

4 Members desirous of joining the Correspondence Course may apply to the Secretary, United Service Institution as soon as possible but not later than 15 May for Part 'B' and 1 June for Part 'D' giving their particulars and cheque for the tution fee. Cheques should be made in favour of Secretary, United Service Institution of India, King George's Avenue, Kashmir House, New Delhi—11.

5 Non-member Officers may join the Course subject to availability of vacancies, by becoming members for which they will be required to pay additional Rs. 20/- i.e. Rs. 10/- as entrance free and Rs. 10/- as a year's subscription.

BOOK REVIEWS

India's Quest for Security—Defence Policies 1947-65

by L.J. Kavic

(Published by University of California Press; 1967) pp. 263, $7.95

Western writers commenting upon developments in India with special reference to Defence, invariably follow the familiar pattern that like most of the underdeveloped countries and those which have a military form of government, Indian armed forces too are a symbol of her desire for international prestige and stature in a power conscious world. This premise leads them to other similar lines of thought. They seem to forget that nations that have broken the Shackles of bondage and foreign rule have to stand up, develop themselves and face the world that still has interests in these areas. The super-powers and their satellites will not allow things to rest themselves and continue to create problems for their own ends. This had been repeated time and again and the cycle will continue until the newcomers join the CLUB of the mighty few singly or in groups and are able to look up at their erstwhile masters and benefactors as equals.

Mr Kavic's study of India's defence policies since 1947 follows the same pattern. He too is not in favour of India developing her nuclear capability. It is costly undertaking and would not necessarily enhance India's prestige among the increasingly more sophisticated nations of Afro-Asia and if India did succeed in creating a tactical nuclear force the usefulness of such an independent force would be marginal against the only real military threat, that of China, and so on.

A country cannot be projected out of its geographical and historical environments and much more so India which has been basically a peace-loving country. Attempts at meeting the external threats to its security and integrity seem to be termed as increasingly chauvinistic tendencies with a 'public opinion which seems strongly insensitive to the country's severe non-military problems and meagre financial resources'. President Ayub Khan in his autobiography *Friends Not Masters* has voiced similar remarks : Brahmin chauvinism and arrogance. Of course, to China all our actions are chauvinistic.

Kavic has cleared India of another charge: there is no basis of the view that the policies of a sovereign India during the 1947-62 period constituted a unique approach to national security distinct from the traditional one of power politics. This assurance was probably required by some. To those wedded to clear-cut power blocs the policy of non-alignment appears 'unique'. India has followed a peaceful policy all these years and would have continued with her small armed forces had she not been forced to increase them by the force of circumstances. A number of other countries in this region too have comparatively small armed forces. The leadership is mature enough to realise the importance of defence *vis-a-vis* her economic development but no country that has achieved freedom after centuries of bondage can afford to 'live with insecurity' as the author of this book would like us to do. No doubt total security has never been possible for any country and 'the essence of a sound national security policy is for govermnent to

define the nation's vital interests and to develop sufficient power, alone or in concert with others, to secure those interests'. India is doing these without aligning herself with any power bloc.

This is one of the few books on the subject which has compressed so much information within such a short space. It is obvious that he has had access to information and personalities which normally one cannot obtain and for obvious reasons these have not been quoted. The opinion of foreign observers cannot always be taken too seriously. The background to the problems has very rightly been taken to the British period of about a hundred years ending with 1947. It was but natural that the successor government followed in the same foot-steps with minor modifications inherent in the peculiar conditions of south east Asia where a vacuum had been created.

Here is an extract from our defence plans: 'In a 1949 assessment of Pakistan as a military threat, Indian military planners are understood to have regarded the possibility of Pakistani attacks across the Punjab plains, the Rajasthan desert, or from East Pakistan as extremely unlikely....The Indian Cabinet accepted the thesis advanced by its military advisers, and contingency planning proceeded on the basis of possible operations in Kashmir, Punjab and Rajasthan with precautionary measures on the borders of East Pakistan....The primary aim of this strategy was to inflict a decisive defeat on Pakistan's field amry at the earliest possible time and along with the possible occupation of Lahore, to compel the Pakistan government to seek peace.... India's strategy was punitive, there being no intention either to everrun large areas of Pakistan or to occupy Pakistani territory....' and so on.

It is obvious that the author has come to his conclusions based on such information and a lot more which is available in a large measure. The development of the armed forces, the army, navy and the air force has been given in simple detail including the country's defence production.

The chapter on Civil-Military relations 1947-62 makes interesting reading and the author has quoted amply from remarks of Indian Officers and civilian administrators. During the decade following independence, however, civilian complacency about defence would seem to have been shared by the military to a considerable degree. The Menon-Thimayya episode has been magnified beyond limits and according to Kavic the consequent differences are supposed to have eroded the professionalism of at least a segment of the army officer cadre. The China war has been dealt with in detail and only a summary has been provided of the Pakistan war.

If the reader is looking for an objective reappraisal of India's defence policies since 1947 these would not be found here. But all the same the contents of the book provide him enough food for thought.

G.S.

Indian Army Through the Ages

by Major Gautam Sharma

(Published by Allied Publishers Private Limited, New Delhi ; 1966) Rs. 26.50

Major Gautam Sharma deserves to be congratulated on bringing out a book on a subject which is of absorbing interest. There is not a single book which describes in a wide.....of history the various phases of the evolution of the Indian Army. It is a difficult task to convey the entire range of

Indian History having a bearing on the subject—but it has been well accomplished. There is hardly an aspect of Indian Army which has not been touched upon-equipment, organization, tactics, strategy, description of battles, etc. In fact it is a well-written book on the subject and satisfies a long-felt need. The sketches of battles help the reader to understand the significance of the tactics adopted by the rival forces. The bibliography is quite exhaustive and shows the cave with which the author has collected information from different sources. The last chapter gives a long but enough account of the organisation of the Indian Army since Independence. It is informative lucid and well-written. It is really encourging that officers of the Indian Army, who have the requisite professional knowledge, are giving to us the benefit of their experience. It would not be out of place to make a suggestion for the improvement of this book. The chapter "Contribution of the Marathas" should precede and not follow the chapter "Rise of the Khalsa". This would be in chronological order. There is no doubt about it that this book will in course of time become a standard text book. It has all the qualities of a good text book.

D.P.

THE SHIELD AND THE SWORD, INDIA 1965 AND AFTER, THE NEW* DIMENSIONS

by Lt. Gen. P.S. Bhagat

(Published by Statesman, Calcutta; 1967) pp. 111 Rs. 12.00.

1965 was the crisis year for India and a turning point in her history. Her decision on 14 Aug 65 to go on the offensive in Kashmir and seal off the routes of the infiltrators was fateful. The whole innings had now to be played out. Pakistan probably did not credit India with the resolve, the strength and stamina to face an all-out war. This is the premise from which the author begins his present treatise which is a follow-up of his earlier work "*Forging the Shield*". While all that follows has been planned and discussed in the usual methodical and incisive manner of a military mind the fact remains that the seeds of this decision were laid much before, in 1962, when the resolve to fight aggression was made once for all. The expansion of the armed forces was undertaken for that purpose only.

Pakistan's aim in Jammu and Kashmir with her large number of 'infiltrators' was clearly to present a *fait accompli* in Kashmir before Indian Forces could be alerted. Every one was very clear that it was a violent flagration of international law whether they crossed the ceasefire line or International border. Pakistan's plans for the escalation of the conflict were bold and audacious. She made full use of her armour in the Chhamb area—'the dagger' pointing at our life-lines into Poonch area. Likewise was the Khemkaran thrust 'The Grand Plan' as the author calls it. It was fortunate that both these offensives got bogged down and finally failed.

Many may not agree with the author when he states that the Indian army fought in 1965 to redeem a reputation. He is obviously thinking of the 1962 reverses. Also that: 'there was no victory, no defeat'. This may be so when no new sources have been examined or are available at present. But for Pakistan who started the offensive the lesson is obvious. On the other hand to us on this side of the frontier its importance, as has been very ably discus-

*Book is available with VAJRA Station Canteen, Jullundhar Cantt.

sed by the author, should not be lost sight of. No sacrifice is big enough for the defence of one's freedom and in this context we should take a lesson from the lightning victories achieved by the Israelis who quietly went on preparing and planning and struck when the enemy was in the greatest threatening posture but unguarded in one direction. But if platitudes are enough this one is worth quoting: If India's adversaries will have war, they shall have war. No longer will India tolerate being pushed around and intimidated.

The closing chapters have laboured the point that it is China which is more dangerous than Pakistan and an enigma and it is this threat that must be countered effectively. Pakistan has a national government and has an independent stance and it is not doing her or India much credit to state that: 'India and Pakistan might have resolved their differences, if they had been left alone, but with China meddling in the sub-continent she will see to it that if anything, the differences are aggravated' (P 75). India's destiny is clear and to achieve these aims mental and material preparedness besides moral courage at all levels must be achieved at all costs. As General Kumaramangalam writes in the Foreword the book does 'stimulate thought' and one comes to grip with the defence problems of the country.

G.S.

IN THE STRIKE ZONE—ISRAEL'S SPECTACULAR; SIX-DAY BATTLE.

by William Stevenson

(Published by International Publishers; Delhi-6. 1968) pp. 142. Price Rs. 12.50.

There is little of military value in this book in the tactical sense. Even the information given of various types of equipment used by both sides during the conflict, is prepared with inaccuracies. The photographs do not show anything interesting or of value to a student of military history or tactics.

But then must every book be of tactical or military value? What the book depicts and high lights is the spirit of a people, of a small country which lived every day in face of danger, wrested a livelihood out of sand and desert and when the time of ultimate destruction was looming up, by a miracle, (are there any miracles in the present day world?) by the dint of hard-work and training over the years, by their indomitable spirit and courage, turned the catastrophe into a victory.

For the students of Amoured tactics, two points stand out:

Firstly — The wrong use of armour by the Arabs who dug in their tanks as pill boxes in the SINAI and GOLAN heights in SYRIA.

Secondly— The bold use of armour by the ISRAELI Commanders, their long hooks and use of armour by night. In war audacity always pays.

If a hundreth of the spirit of these people as fleetingly glimpsed in the words of a girl living on the border by choice, who says "The borders must be defended. It is easy enough to say, let the other fellow do it", it can be absorbed in this country of ours, we shall not only win every battle during war and during our daily life but become the greatest nation on earth.

ASV

Farewell to Wings

by Cecil Lewis

(Published by Temple Press Books, London; 1964). pp. 84. Price 18s.

It is an autobiography of a First World War pilot, who has attempted to recapture some of the glory of the early days of flying some fifty years after the outbreak of the 1914 war. Like most of the autobiographies, written after such a long lapse of time, it is a nostalgic narration, describing many amusing events and some piognant situations. The thrill and adventure of flying in these days, when much greater camaraderie existed between the pilots and their machines than what exists now in these days of sophistication, is vividly described here. It gives the reader a fair idea of the types of aircraft, their behaviour , performance and above all their personality.

Cecil Lewis describes some twenty-four models of aircraft from such highly—manoeuvrable single seaters like the Sopwith Spad and the Nieuport Scout to the crudely valiant Vickers Vimy. He invests each aircraft with a personality and describes them with touching feelings. It is an absorbing narration of an era of single—handed combat which was drawing to a close, and in which the pilots of the first world war were the last to enter.

K.S.T.

Best Army Stories

Edited by Andrew Graham.

(Published by Faber and Faber, London). pp. 240. Price 21s.

Andrew Graham, an ex regular army officer and now wine correspondent of The Times has served a highly charged cocktail of twenty three short army stories.

This is a collection of stories written as such and extracts from books. The author refers to the former category as "conventional stories"—having a beginning, a plot and an end and the later are described as 'slices of life'. There are 10 British stories, 3 American, 4 French, 2 German, 1 Indian, 1 Japanese and 2 Russian, but more than one story has an Indian cast.

The authors include Ambroce Bierce, Thomas Hardy, Rudyard Kipling, Conan Doyle, Leo Tolstoi & Manohar Malgonkar.

Since each of these stories is likely to linger in one's memory like good wines with different tastes, the author has sequenced them cleverly so that the effect of one is not spoiled by the one that follows. For this reason it is recommended that the stories be read in the sequence in which they are printed. Better still the book should not be read in one sitting—difficult to resist though.

R.D.A.

British Aircraft 1809—1914

by Peter Lewis

(Published by Putnam, London ; 1962). pp. 576 Price 63s.

The British Aircraft 1809-1914 fulfils a longfelt need. A great deal has been written on the achievements of the pilots of the pre-1914 era, but the aircraft which helped them perform these feats have gone unnoticed. Peter Lewis makes a commendable effort in this book to bring together the details of early aircraft of England. The book lists many wierd aircraft, which even though of historical value, provide an interesting link in the growth of aeronautics in Britain. The text lists aircraft first in alphabetical order of constructors' name and then in order of appearance where a particular manufacturer produced a series of aircraft. Peter Lewis seeks to focus attention on the valuable contribution of Britain to the development of aircraft industry and observes with justifiable pride that it was to Great Britain that the honour fell of discovering the formula which the layout of the aeroplace followed when it finally appeared as a successful and practical instrument of flying. Its originator was Sir George Cayley, who by his inventive genius had evolved the general form of the aeroplane by 1804. It is interesting to learn that as early as 1849, some fifty four years before the achievement of Wright Brothers, a ten years old boy floated twice a few yards in a small glider and in 1952 Sir Cayley's coachman made the first man-carrying flight.

The book is profusely illustrated with photographs and diagrams.

K.S.T.

Famous Fighters of the Second World War (Second series)

by William Green.

(Published by Macdonald and Co., London; 1962) pp. 132. Price 21s,

This is a story of those combat aircraft which, even though not supremely successful technically, achieved great fame during the Second World War in various operations. The book also makes a mention of those aircraft which were operationally failures and yet which succeeded in capturing public imagination. Twelve fighters in all have been described in this book including the Soviet Fighters Polikarpov I-16 and the Yakovlev, the Italian fighter Macchi—Castoldi, the German Junkers JU—88 and the Heinkel HE—219 and the Japanese fighters Nakajima Hayabusa and the Nakajima Hayate. Among the American fighters which find a place in this description of elite of Combat aircraft, are the Grumman Wildcat, which stirred public imagination by its remarkable performance in Wake Island operations and the Chance Vought Corsair which was universally acknowledged to be the first naval fighter of the Second World War. Among the British fighter are the Defiant, which proved its worth during the Dunkirk evacuation and the Gladiator which won great fame at Malta.

It is an absorbing narration and does justice to the air craft, which brought glory to the aces, who are so well-known.

K.S.T.

CORRESPONDENCE

Correspondence is invited on subjects which have been dealt in the journal, or which are of general interest to the Service

To

The Editor,
USI Journal,
Kashmir House,
NEW DELHI-11.

I

OFFICERS FOR THE TWENTY-FIRST CENTURY

Sir,

Col R.D. Palsokar in his article entitled 'Officers For The Twenty-First Century' has very ably and aptly brought out the paramount future necessity of Scientific Oriented Officer with better intelligence quotient in all arms and services. In my view this is only possible if the existing methods of selection are radically modified and certain other essential steps taken before we can expect suitable officer material to come forward for selection; for you can take a horse to water but not force him to drink. In the same way a person with low intelligence quotient, "poor at verbal and abstract reasoning and with poor numerical ability" will be unable to grasp the fundamentals of nuclear physics and nuclear weapons.

The three major sources of recruitment as given by the author are:

(a) NDA entry and direct entry cadets.
(b) Technical graduates.
(c) Serving soldier cadets.

The NDA entry cadets which are selected do not possess the pre-requisite of higher intelligence quotient because not even the third best category of students come forward to join the army. The very best i.e. genius are certainly not required. The next best category prepares and joins the big firms and business houses where intelligence is valued and well rewarded. Slightly lower category either joins the IAS or IPS or go in for higher specialised studies in technical subjects which are more paying and beneficial in the long run. The result is that the candidates with intelligence quotient lower than average or those few who though possess average intelligence but cannot afford to pay for higher studies volunteer to appear for the NDA. It is stated by a reliable source that such candidates range with IQ rating which is quite low. So with this stuff coming to NDA it is difficult to foresee the type of scientific leader of future army being produced with the best of syllabii, best of teachers and best of teaching techniques. But, still this category with direct entry cadets provide better stuff when compared to other two categories and meets Army's future requirements to a limited extent.

The same sorry tale can be enumerated for technical graduates. After all why should a good technical hand come to army where the equip-

ment is of 19th century; where the engineering techniques are of antique ages, and where he foresees that his technical skill instead of being utilised properly is allowed to stagnate and deteriorate? There are better avenues open to him in civil life and if and when he does not get these, then he reluctantly comes forward to join the technical arms of army. This and this alone explains the acute shortage of adequate number of technical candidates and consequent shortage in technical arms.

Serving soldier candidates possess very poor educational background and generally possess intelligence quotient much lower than city bred candidates for NDA or direct entry cadets. Moreover, before being trained in army cadet college, they are required to pass only Army First Class Certificate of Education, the standard of which is not even equal to Higher Secondary School Leaving Certificate. In my view the present day soldier cadets will never be able to make a good future scientifically oriented officer. But in case the army desires to draw a portion of officer cadre from serving soldier then it is needless to say that the present-day education standard for recruitment to a soldier's rank should be considerably enhanced.

Nor is this the end of sorry tale. I am given to understand from authoritative and reliable source that serving soldier cadets are not given the "Intelligence Quotient" test at the time of their selection at SSB. Instead they are administered only personality test. How on earth can personality test substitute IQ test? How do the selectors ensure that such cadets have the barest minimum IQ required for a cadet and the future officer of the Twenty-First Century to grasp the fundamentals of scientific education ? Such cadets may have personality but they certainly do not have any brains. It is well worth finding out from those who are intimately connected with the training of such cadets as to the receptivity of such cadets, their understanding of the fundamentals of science and their powers of comprehension. I have my doubts.

Now when our basic lacuna is poor stuff then how to get better stuff. This is only possible if following fundamental prerequisites are fulfilled:-

(a) Raise the standard of selection, i.e. minimum IQ rating.
(b) Better service conditions for all ranks.
(c) Better pay scales.

This is possible by—

(a) Selecting only candidates with IQ rating between 110—130
(b) By raising standard of recruitments to soldiers rank.
(c) By administering IQ test to the serving soldier cadets.

The service conditions in India are extremely conducive for every one not to join the army. Some of most important are:-

(a) Poor living conditions all round both in field and peace.
(b) Constant separation from wife and children.

The pay scales including the fringe benefits available in civil when compared to army are much better. This point is amply proved by the recent grant of non-practising allowance to army Doctors. Prior to this grant there was acute shortage of doctors in the army. With the grant of non-practising allowance the army is not only getting the adequate numbers of doctors but also of good quality. Same holds true for other arms. Increase the pay and much better stuff of officer cadets will willingly come forward to join the army.

These are but few suggestions. Many more can be found if only a high powered board is appointed to delve deep into this vitally urgent problem.

The present day Indian Army is certainly good. But in case the present army is to keep up the standard and keep abreast with the future trend it is necessary to have scientifically oriented officer cadre. This is only possible by selecting good officer cadets, raising the standard of selection particularly the IQ rating and improving both service conditions and pay scales. And if the writing on the wall is any indication then the matter should be tackled now or never.

Major S.N. GULATI

Indian Military Academy
Dehra Dun, 2 Sept. 67

II

TRAINING FOR WAR

Sir,

In "Training for War" by Major K. Brahma Singh, published in the January-March 1967 issue of your Journal, the author while discussing various aspects of training in the Indian Army has pointed out certain obstacles normally impeding the conduct of training. But, he has forgotten an important obstacle which costs huge sums of money, ties down a large number of men and consumes so much of time. Every year we have a long programme of sports fixtures; it is mainly carried out in winter which is also the training period. For nearly every one of these fixtures the chain starts at the unit level and, passing through the brigade/sub-area competitions, leads to division/area, command, services and finally ends into the national affairs. Each of the competitions takes so much of time that the last months of a year become the sports period indeed. Men start practising their events they have to participate in, long before the due date, plenty of money is spent on sports gear and on the shows themselves. The organising standard of any sports is judged by the standard of tea and snacks served. The cost, occupation of men and consumption of time varies with every item, but goes on adding as the competitions change their designation according to the level of formation concerned.

Take atheletics; these are the biggest consumer of time, men and money. All this is carried out at the cost of training. I am not against sports, but all this waste can be avoided if we restricted these competitions to a useful level; I suggest these may be held at station basis and then selections

for the nationals carried out, for which the responsibility should be given to the Services Sports Control Board and the School of Physical Training. This will economise in manpower, money and time, which could be devoted to training; otherwise, at the moment, unit and formation commanders are more worried about these fixtures and trying to get a good name in the sports-field.

Secondly, this "farce" of training directives should be done away with. These days, for a training directive instruction to be "good" it depends upon the number of pages it has: more the pages the better it is; and especially whether or not it contains more pages than the one of the previous year's. Once, when raising a battlion I had prepared a training instruction for the period the unit was being raised. Within a few days a training instruction from the Higher formation was received, and based on this I was asked to write a new training instruction. Although it took time, but I produced a training instruction of many pages. When I took a copy each of these instructions to the staff officer at the formation headquarters I told him: "This training instruction (pointing towards the thin one) is what I am going to carry out; and this (handing over the newly prepared voluminous one) is for you." We both smiled and I left his office.

What I want to emphasise here is that the efficiency in training of our army these days is judged by the volume of training directives/instructions, the well prepared weekly training programmes, the punctual submission of "Important Training Events' return. But, have we ever examined as to what important training events, and what part of the weekly training programmes have actually been carried out on the ground? How much of the training instruction/directive has been complied with? This, I leave to the persons conncerned to judge.

I would, therefore, suggest that we forsake this "farce", and get down to the real training.

Maj. GULCHARAN SINGH

Headquarters Bengal Area
Fort William Calcutta-21
26, Dec. 67

SECRETARY'S NOTES

ANNUAL SUBSCRIPTION

I would like to thank all those members who paid their subscription so promptly at the beginning of the year. To those of you who have not yet paid, may I remind you that your subscription was due on the 1st January. Would you please, therefore, put a cheque in the post to me TODAY.

CHANGES OF ADDRESS

Several cases of non receipt of Journals have been reported due to members not informing the Secretary of their changes of address. Members are requested to inform this office promptly whenever there is a change of address.

NEW MEMBERS

From 1st October 1967 to 31st December 1967, the following new members joined the Institution:-

ABEDEEN, Major Z. Arty
AMARPAL SINGH, Captain, The JAK Rifles
ASHOK CHARAN, Major, ASC
ASSUDANI, Captain, C.L., Engrs.
BRIJ KISHORE, Major, ASC
BALI, Major R.M., Light Regt.
BAINS, Major G.S. Sigs.
BAWA, Captain O.P., Arty
BENJAMIN CHACKO, Major, ASC
BHARATHAN, Captain T., Arty
BHATNAGAR, Major J., ASC
CHADHA, Major S.C., The Guards
CHAUHAN, Captain K.S., Engrs.
CHEEMA, Major A.S., The Para Regt.
CHERIAN, Major M.A., EME
CHOUDHURY, Major N.R.D., ASC
DAGAR, Captain R.S., Armoured
DEOL, Captain J.S., ASC
DHAWAN, Major R.K., EME
DHILLON, Captain S.S., Bihar Regt
GODIN, Captain S.F., ASC
GOKHALE, Captain B.S., AOC
GUPTA, Major P.K. Engrs.
GUPTA, Major R.S., The Mahar Regt
GURBACHAN SINGH, Major, ASC
GURDEV SINGH, Captain, AD Regt
HANMANT SABALE, Captain, AOC
HARBANS NARAIN, Major, Arty
JACOB, Captain, S.
JALLY, Major, N.N.
JETLEY, Major, M.L.
JOGINDER SINGH, Captain, AOC
KAHLON, Captain H.S., The Punjab Regt.
KAPOOR, Captain D.R., The Garh Rifles
KHANDURI, Major J.P., The Kumaon Regt
KHANNA, Captain R.S.
KHATTRI, Major M.S., The Bihar Regt
KRISHNAYYA, Captain, H., The Armd Corps
KUMAR, Captain A.R., The Gorkha Rifles
LALKAKA, Gp. Capt. N.K., IAF
LOBO, Captain G.T.
LONGER, Colonel, V.
MAHENDRA PRATAP, Major, The Mahar Regt

MALIK, Major M.S., The Raj Regt
MANOCHA, Captain V.B., The Raj Rif
MATHUR, Major H.S., EME
NARAIN SINGH, Major, The Punjab Regt
NATH, 2/Lieut. C.P.C., Sigs
PANDIT, Major D.K., Engrs.
PANNU, Major G.S.
PANTHAKI, Captain M.,
PASSI, Major R.C.
RAGHAVAN, Major N., Engrs.
RAI, Major A.P., The Gorkha Rifles
RAJESHWAR SINGH, Major, Engrs
RANDHAWA, Captain S.S., The Punjab Regt
RANGARAJAN, Major P., The Sig Regt
RANAWAT, Captain R.V.S., The Assam Rifles
RATTAN, Major Y.R., The AD Regt
ROY, Major A.N., AMC
SABHARWAL, Major S.K., The Armd Regt
SAHI, Captain K.S., The Jat Regt
SASTRY, Major, V.R.M.
SATPATI, Captain A.K.,
SEHGAL, Captain S.L., ASC
SEKHON, Captain S.P.S.
SEN GUPTA, Captain A.K., Infantry
SHARMA, Major D.K.,
SHARMA, Major D.V. EME
SHARMA, Major S.B., Sigs
SIDHU, Captain J.S.
SINGH, Captain K.P., ASC
SHANKAR PRASAD, Captain, The Gorkha Rifles
SHRINET, Major H.S., ASC
SURI, Captain A.K., Engrs
SURINDER KUMAR, Captain, AOC
TANWARI, Captain M.S., ASC
TIWARI, Major B.L., ASC
UPPAL, Captain D.S. The AD Regt
VARMA, Major S.K.
VERMA, Major K.L.
VASANT PATIL, Captain
VIJAY KUMAR, Major, ASC
VIJAY UPPAL, Captain
VIJAYAVARGIYA, Major J.P.,
VIRENDERA KUMAR, Major
YASHPAL, Captain, The Sikh Regt

Six officers messes and institutions were enrolled as subscribing members during this period.

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